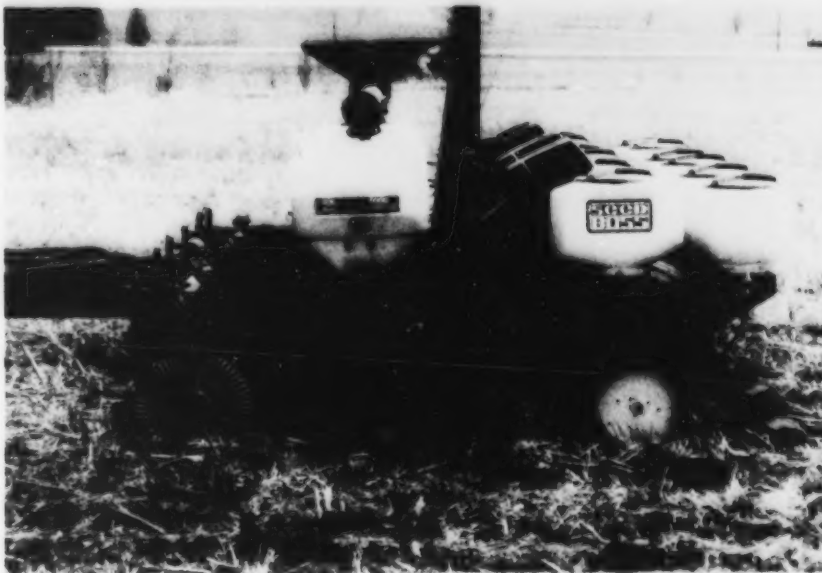


# Conservation Tillage Handbook



## Equipment Modifications and Practical Tips for Use



SOIL AND WATER ENVIRONMENTAL ENHANCEMENT PROGRAM

# **SWEET SWEET**

Canada

 Ontario

# **CONSERVATION TILLAGE HANDBOOK: EQUIPMENT MODIFICATIONS AND PRACTICAL TIPS FOR USE**

## **FOREWORD**

This handbook provides a pictorial overview of some examples of conservation equipment 'hardware' contributing to conservation farming activities in southwestern Ontario. By clearly identifying specific modifications and highlighting practical tips for use, this handbook orients the reader to the terminology and some of the system options available to those beginning or expanding conservation tillage practices.

**Having access to appropriate tillage or planting equipment is only one of many management factors to consider when conservation farming. Other factors which must be considered include: weed, insect and disease control; fertilizer types and placement; crop types and rotations; use of livestock manures; and managerial interest and capability.** Therefore, it is recommended that the reader contact their local office of the Ontario Ministry of Agriculture and Food, agribusiness personnel or others with experience in conservation farming before beginning the process of deciding which tillage equipment (or modification) will best meet their individual conservation needs.

## **DISCLAIMER**

Conservation tillage equipment or practices highlighted in this handbook are based on user experience. Check with manufacturers for machine use and setup, as modifications may invalidate warranties.

Inclusion of any brand names does not imply endorsement of use by publishers of this handbook, nor does it suggest that other brand names are not effective.

The views contained herein do not necessarily reflect the views of the Government of Canada, the Government of Ontario or the SWEEP Management Committee.

## **ACKNOWLEDGEMENTS**

The authors wish to express their gratitude to the following individuals for providing helpful comments on the project work plan and earlier drafts of this handbook:

Wally Findlay, Ph.D., P.Ag.  
Howard Lang

George Schell  
Don Lobb

Agriculture Canada, Harrow, Ontario  
Ontario Ministry of Agriculture and Food,  
Soil & Water Management Branch, Guelph, Ontario  
Ecological Services for Planning, Guelph, Ontario  
Conservation Farmer, Clinton, Ontario

In addition, compilation of this handbook would not have been possible without the participation of conservation farmers who generously provided their time and practical knowledge of conservation farming systems. Their names appear on the inside back cover of this handbook.

This publication was prepared under contract to the Technology and Evaluation Development Subprogram of Agriculture Canada by the following staff of Ecologistics Limited, Waterloo, Ontario:

Paul Brubacher, M.Sc., P.Ag.  
Jane Sadler Richards, M.Sc., P.Ag.  
Kevin McKague (photography), B.Sc., P.Eng.

October, 1989

## CONTENTS

	<i>Page</i>
INTRODUCTION .....	1
THE MOLDBOARD PLOW AS A CONSERVATION TOOL .....	2
CHISEL PLOWS .....	4
OTHER MINIMUM TILL EQUIPMENT .....	6
CONSERVATION SEED DRILLS .....	8
CONSERVATION ROW CROP PLANTERS .....	12
RIDGE-TILL SYSTEMS .....	18

## INTRODUCTION

The term 'Conservation Tillage' applies to many different types of tillage and planting equipment, as well as to the way in which they are used. One of the key goals of conservation tillage is to leave residues of previous crops on or near the surface of the soil. These residues cushion the erosive impact of raindrops on the soil surface, slow surface water flow, facilitate infiltration of precipitation into the soil, and conserve moisture. In Ontario, land is considered to be 'conservation' tilled or planted when at least 20 to 30% of the soil surface remains covered with crop residue after planting.

The equipment described in this handbook can assist the farm operator in achieving these residue targets. The handbook is organized by conservation tillage or planting system as described below:

1. *minimum or mulch tillage*—any system that includes some form of tillage in fall and/or spring in which crop residues are partially incorporated into the soil. On many soils, 20 to 30% residue cover is effective in controlling erosion.

In this handbook, the modified moldboard plow, the chisel plow and other types of minimum till equipment are considered part of this tillage system.

2. *conservation seed drills*—a small slit is opened or a narrow strip of soil is worked by means of a non-powered ripple or fluted coulter running ahead of, or with the seeding units. Chemical weed control generally substitutes for cultivation.
3. *conservation row crop planters*—no seedbed preparation is required other than that provided by various optional non-powered attachments on the planter itself. The resulting tilled strip of soil in the row area is generally a maximum of 25 cm (10 in) wide and 15 cm (6 in) deep. Chemical weed control generally substitutes for cultivation.
4. *ridge tillage planting systems*—a ridge of soil is formed when cultivating for weed control in row crops. The succeeding crops are then planted directly onto the top of the ridge after the existing crop residue is removed, usually by non-powered attachments to the planter.

In order to put the equipment photographs into context, the discussion about each system includes the following points: equipment modifications, attachments and costs (when available); field conditions of use; and practical tips for use.

---

**IMPORTANT NOTE CONCERNING THE FOLLOWING  
PAGES**

**THE PAGES WHICH FOLLOW HAVE BEEN FILMED  
TWICE IN ORDER TO OBTAIN THE BEST  
REPRODUCTIVE QUALITY**

**USERS SHOULD CONSULT ALL THE PAGES  
REPRODUCED ON THE FICHE IN ORDER TO OBTAIN  
A COMPLETE READING OF THE TEXT.**

---

**REMARQUE IMPORTANTE CONCERNANT LES  
PAGES QUI SUIVENT**

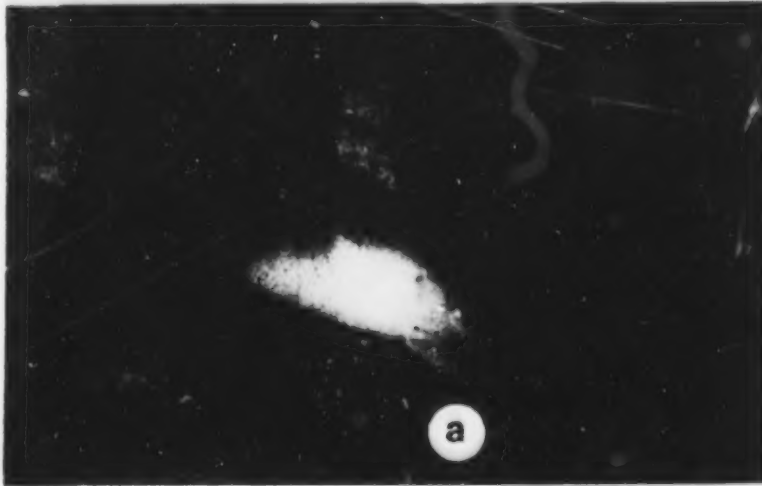
**LES PAGES SUIVANTES ONT ÉTÉ REPRODUITES EN  
DOUBLE AFIN D'AMÉLIORER LA QUALITÉ DE  
REPRODUCTION**

**LES UTILISATEURS DOIVENT CONSULTER TOUTES  
LES PAGES REPRODUITES SUR LA FICHE AFIN  
D'OBTENIR LA LECTURE DU TEXTE INTÉGRAL**

## THE MOLDBOARD PLOW AS A CONSERVATION TOOL

### PLOW A

Make: Oliver  
Model: 3342  
Size: 3 furrow — 16" bottoms;  
fully mounted  
Year: 1969  
Horsepower required: 50 H.P.



### Modifications/Attachments

- a. half of moldboard cut off

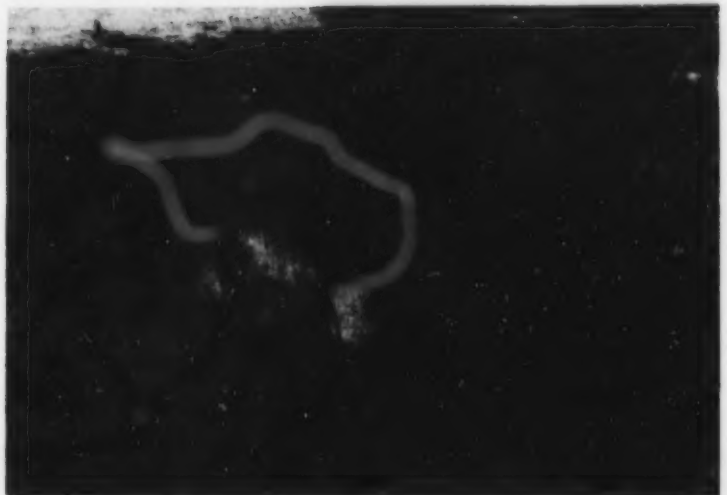
Note: cover boards (trashboards)  
removed (not showing)

### Field Conditions of Use

Corn Heat Units:	2850
Soil Texture:	variable
Drainage:	good
Stoniness/Slope:	variable/up to 15%
Crop Residue Types:	corn, soybeans, wheat, barley
Crops to be Planted:	all

### Practical Tips for Use

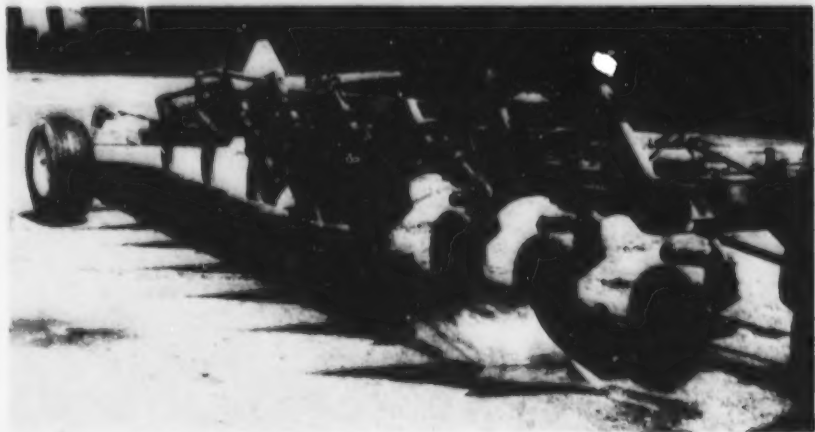
- i) Start by removing small portions of the moldboard, cutting off more to get the desired amount of surface residue.
- ii) With semi-mounted plows, depth and steering may need to be adjusted so the plow functions properly.



# THE MOLDBOARD PLOW AS A CONSERVATION TOOL — cont'd

## PLOW B

Make: Kongsilde  
 Model: 600 series  
 Size: 6 furrow — 14" bottoms;  
 Year: 1985  
 Horsepower required: 110 H.P. is ample



## Modifications/Attachments

- a. furrow widths manually adjusted to 14"
- b. note elongated, less curved shape of European-style moldboard

## Other

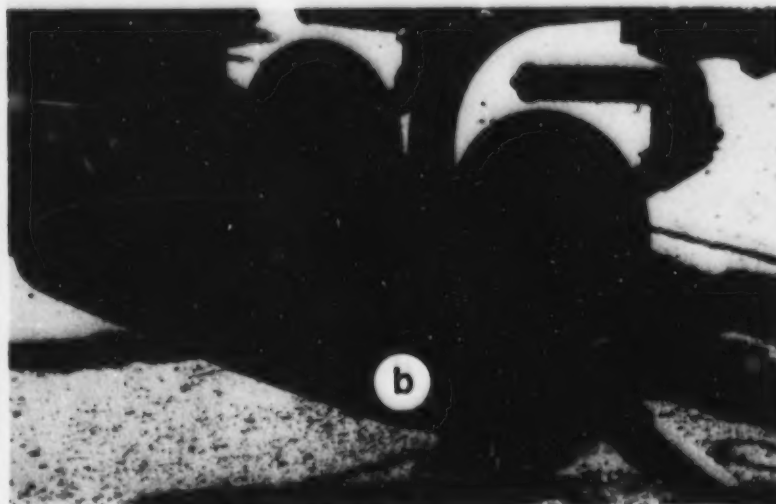
- plow set to work at 6" maximum depth
- removed cover boards (trash boards)

## Field Conditions of Use

Corn Heat Units: 2750  
 Soil Texture: mostly silt loam;  
                   some clay, clay loam  
 Drainage: good to excellent  
 Stoniness/Slope: few/gentle,  
                       compound slopes  
 Crop Residue Types: corn stalks, wheat  
                               straw and stubble  
 Crops to be Planted: corn, soybeans,  
                               cereals

## Practical Tips for Use

- i) If possible, plow perpendicular to harvesting direction to help spread out residue between furrows.
- ii) Cross slopes with chisel plow after plowing to roughen soil surface and slow surface water movement.
- iii) A 'Kongsilde' subsoiler or 'rent' disc harrow is used for secondary tillage in the spring.

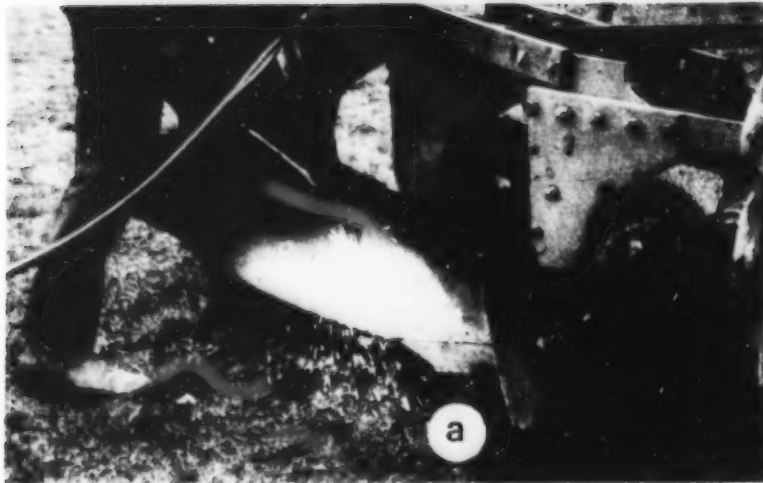
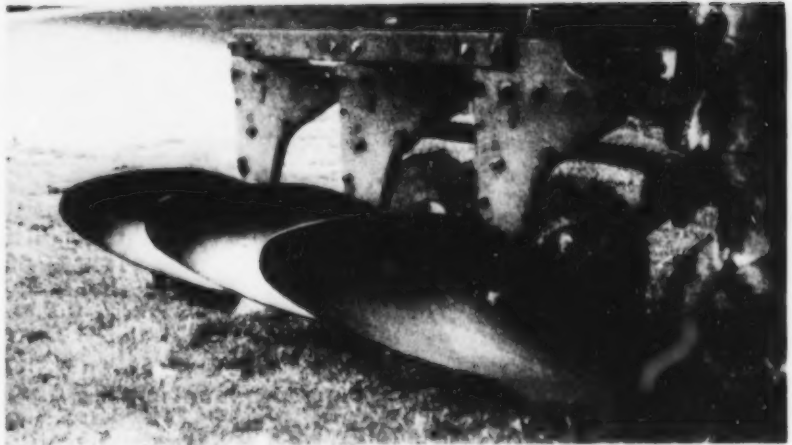




## THE MOLDBOARD PLOW AS A CONSERVATION TOOL

### PLOW A

Make: Oliver  
Model: 3342  
Size: 3 furrow — 16" bottoms;  
fully mounted  
Year: 1969  
Horsepower required: 50 H.P.



### Modifications/Attachments

- a. half of moldboard cut off

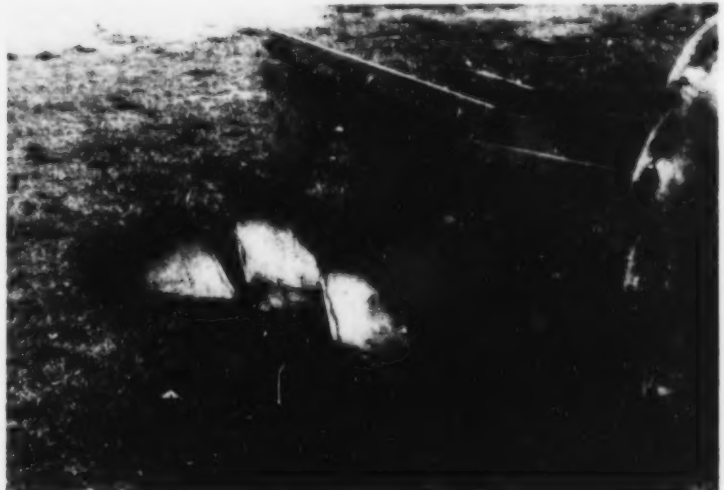
Note: cover boards (trashboards) removed (not showing)

### Field Conditions of Use

Corn Heat Units:	2850
Soil Texture:	variable
Drainage:	good
Stoniness/Slope:	variable/up to 15%
Crop Residue Types:	corn, soybeans, wheat, barley
Crops to be Planted:	all

### Practical Tips for Use

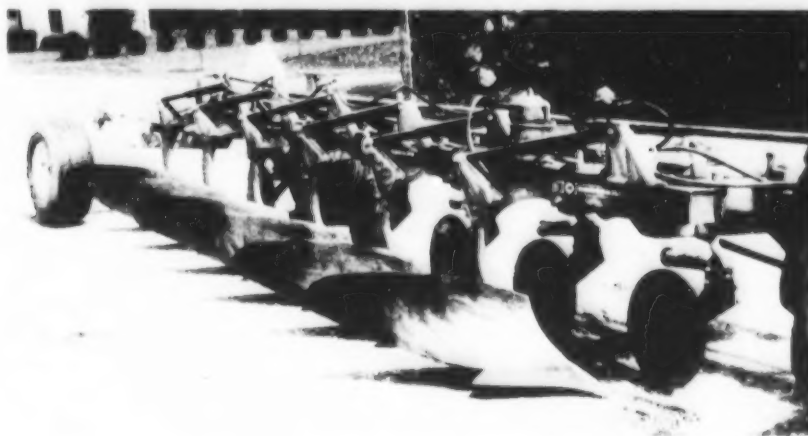
- i) Start by removing small portions of the moldboard, cutting off more to get the desired amount of surface residue.
- ii) With semi-mounted plows, depth and steering may need to be adjusted so the plow functions properly.



# THE MOLDBOARD PLOW AS A CONSERVATION TOOL — cont'd

## PLOW B

Make: Kongskilde  
 Model: 600 series  
 Size: 6 furrow — 14" bottoms;  
 Year: 1985  
 Horsepower required: 110 H.P. is ample



## Modifications/Attachments

- a. furrow widths manually adjusted to 14"
- b. note elongated, less curved shape of European-style moldboard

## Other

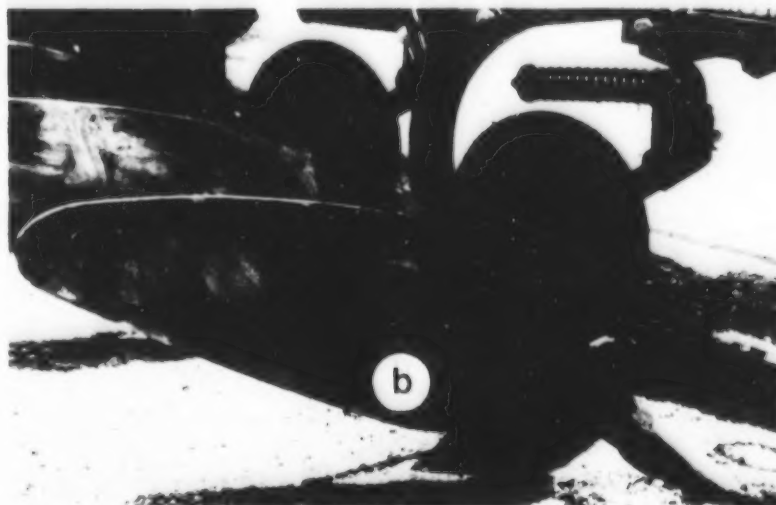
- plow set to work at 6" maximum depth
- removed cover boards (trash boards)

## Field Conditions of Use

Corn Heat Units:	2750
Soil Texture:	mostly silt loam; some clay, clay loam
Drainage:	good to excellent
Stoniness/Slope:	few/gentle, compound slopes
Crop Residue Types:	corn stalks, wheat straw and stubble
Crops to be Planted:	corn, soybeans, cereals

## Practical Tips for Use

- i) If possible, plow perpendicular to harvesting direction to help spread out residue between furrows.
- ii) Cross slopes with chisel plow after plowing to roughen soil surface and slow surface water movement.
- iii) A 'Kongskilde' cultivator or 'Kent' discavator is used for secondary tillage in the spring.

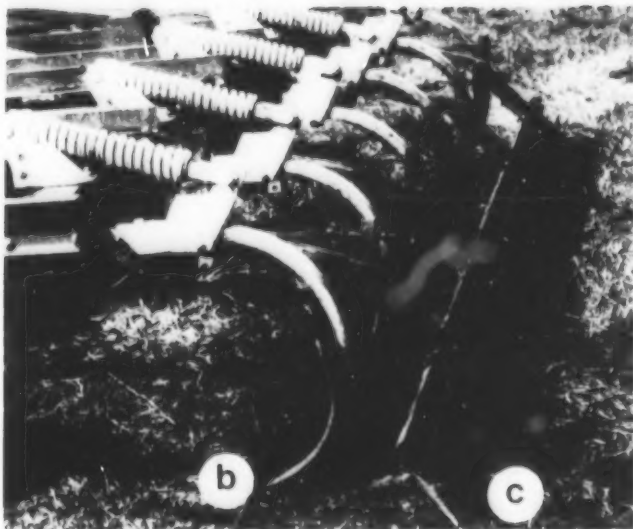




## CHISEL PLOWS

### PLOW A

Make: Glencoe Soil Saver  
(Coulter Chisel Plow)  
Size: 11 shank, 15 foot width  
Year: 1985  
Horsepower required: 160 H.P.



### Modifications / Attachments

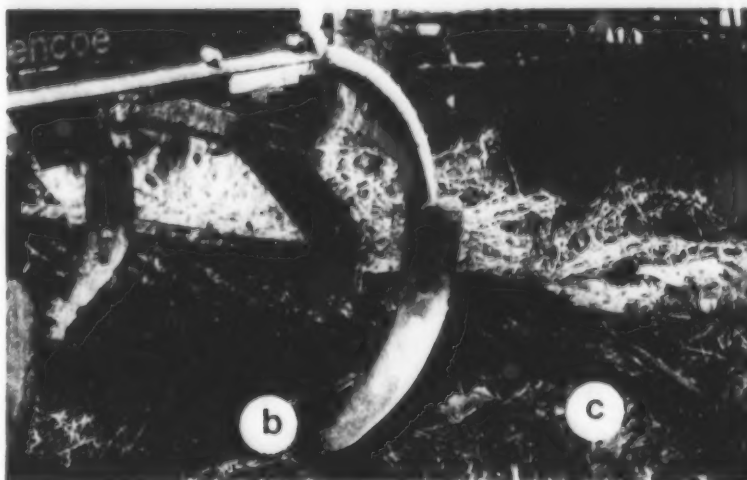
- a. gang of flat coulters (standard equipment)
- b. twisted shovel attachment
- c. leveling harrow ('Salford' Farm Machinery — \$500 in 1989)

### Field Conditions of Use

Corn Heat Units:	2850
Soil Texture:	sandy loam to clay loam
Drainage:	good
Stoniness/Slope:	yes/up to 15%
Crop Residue Types:	corn, wheat, soybeans
Crops to be Planted:	corn (where manure applied)

### Practical Tips for Use

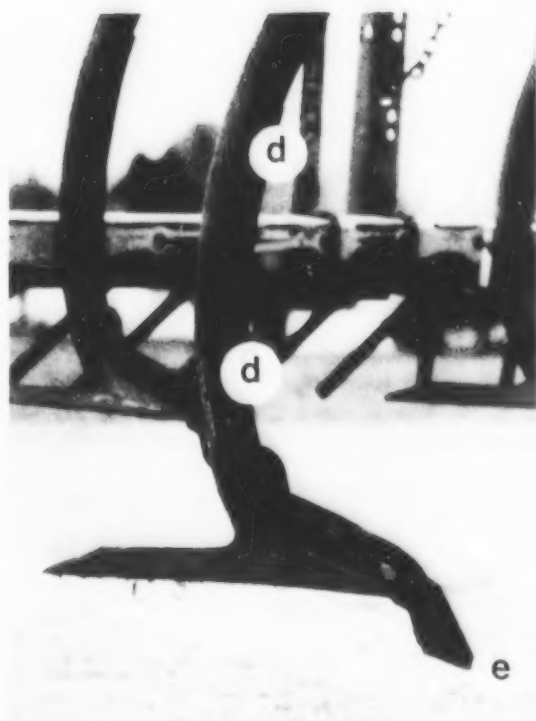
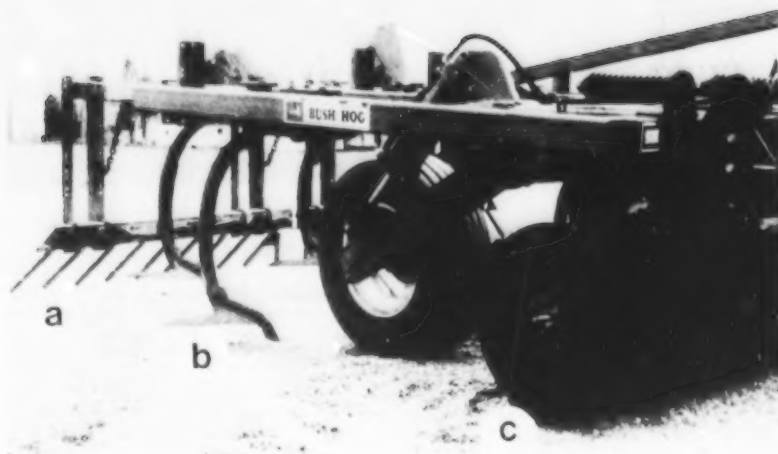
- i) Use to incorporate manure on unplowed ground in the spring.
- ii) Attach leveling harrow to minimize secondary tillage.
- iii) Secondary tillage is done with a cultivator.
- iv) "If it's too wet to moldboard plow, it's too wet to chisel plow".



## CHISEL PLOWS — cont'd

### PLOW B

Make: Bush Hog Coulter Chisel Plow  
 Model: SH 1560  
 Size: 7 shank (15" shank spacing)  
 Year: 1985  
 Horsepower required: 140 H.P. (up to 175 H.P. in clay)



### Modifications/Attachments

- a. 10 foot buster bar leveling harrow ('Midwest')
- b. 18" chisel sweep
- c. 22" diameter coulter blades ('Hershel') \$30/blade (16 blades at 7.5" spacing)
- d. shank guard—homemade, slightly wider than shank to reduce shank wear when using sweeps
- e. Agri-tech hardened point ('Keho') protects 18" sweep and assists penetration of soil

### Practical Tips for Use

- i) Use Agri-Tech points to improve penetration, maintain uniform tillage depth and break plow pan.
- ii) Attach leveling harrow to minimize secondary tillage.
- iii) Operate at at least 5 m.p.h. at about 5" deep. Operate at a 10 to 20° angle to previous crop row.
- iv) Use straight edge coulters rather than discs to minimize trash coverage. 22" diameter coulters are better than 20" coulters to reduce plugging or piling of residues on sandy ground.
- v) Follow with a high clearance cultivator or a one pass tillage tool (e.g. soil finisher).
- vi) Avoid herbicides which may be tied up by residue.
- vii) Increase seeding rate by 5 to 10% in corn residue.

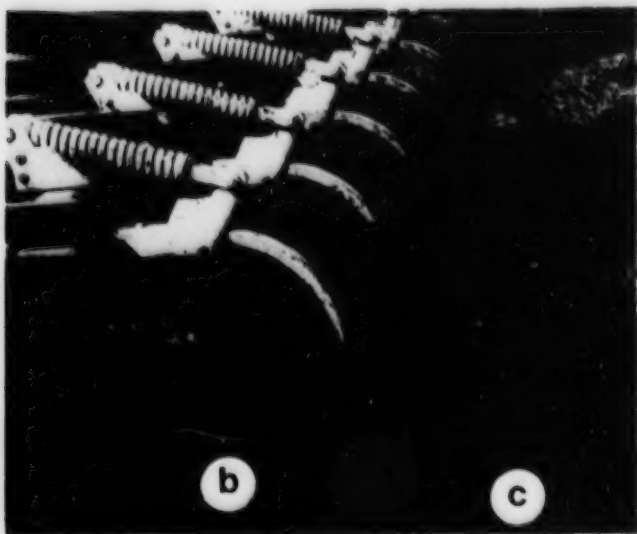
### Field Conditions of Use

Corn Heat Units: 3200  
 Soil Texture: sand to Brookston clay  
 Drainage: good on sand, fair on clay  
 Stoniness/Slope: no/flat to gently sloping  
 Crop Residue Types: corn, soybeans, wheat  
 Crops to be Planted: corn, soybeans, wheat

## CHISEL PLOWS

### PLOW A

Make: Glencoe Soil Saver  
(Coulter Chisel Plow)  
Size: 11 shank, 15 foot width  
Year: 1985  
Horsepower required: 160 H.P.



### Modifications/Attachments

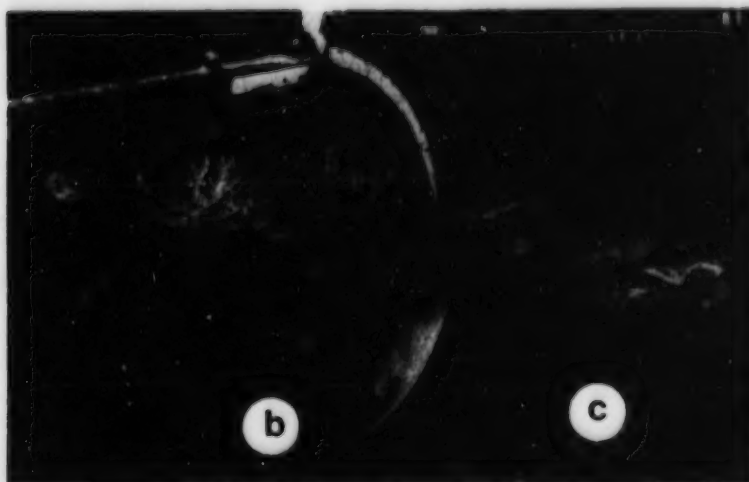
- a. gang of flat coulters (standard equipment)
- b. twisted shovel attachment
- c. leveling harrow ('Salford' Farm Machinery — \$500 in 1989)

### Field Conditions of Use

Corn Heat Units:	2850
Soil Texture:	sandy loam to clay loam
Drainage:	good
Stoniness/Slope:	yes/up to 15%
Crop Residue Types:	corn, wheat, soybeans
Crops to be Planted:	corn (where manure applied)

### Practical Tips for Use

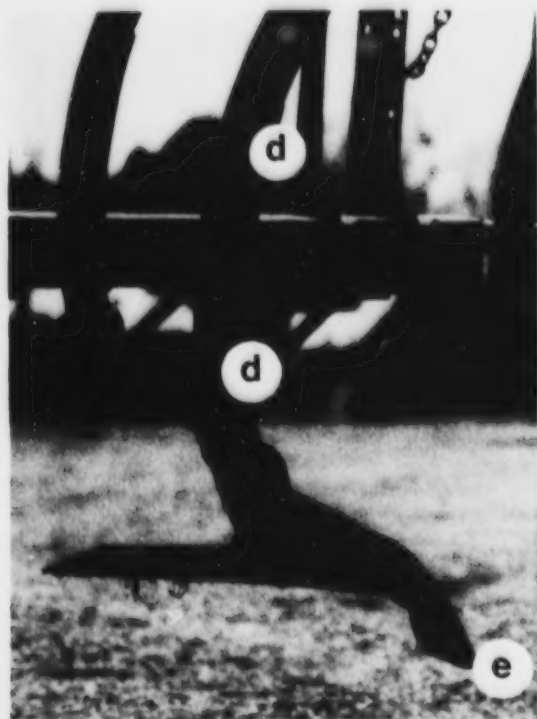
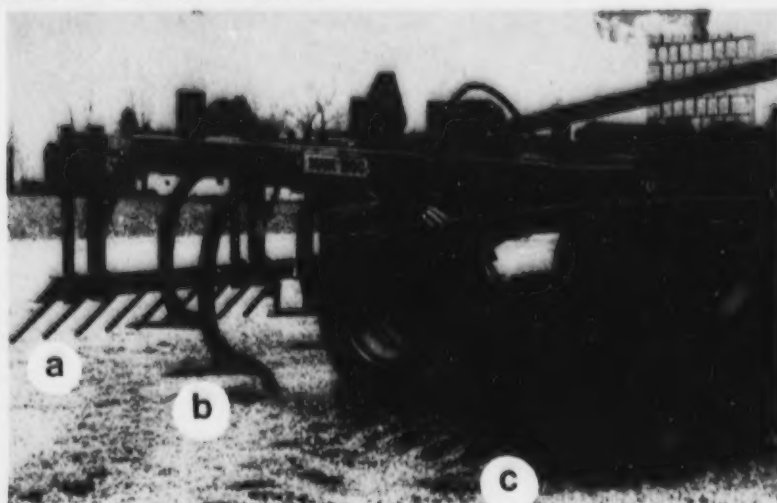
- i) Use to incorporate manure on unplowed ground in the spring.
- ii) Attach leveling harrow to minimize secondary tillage.
- iii) Secondary tillage is done with a cultivator.
- iv) "If it's too wet to moldboard plow, it's too wet to chisel plow".



## CHISEL PLOWS — cont'd

### PLOW B

Make: Bush Hog Coulter Chisel Plow  
 Model: SH 1560  
 Size: 7 shank (15" shank spacing)  
 Year: 1985  
 Horsepower required: 140 H.P. (up to 175 H.P. in clay)



### Modifications/Attachments

- 10 foot buster bar leveling harrow ('Midwest')
- 18" chisel sweep
- 22" diameter coulters blades ('Hershel') \$30/blade (16 blades at 7.5" spacing)
- shank guard—homemade, slightly wider than shank to reduce shank wear when using sweeps
- Agri-tech hardened point ('Keho') protects 18" sweep and assists penetration of soil

### Practical Tips for Use

- Use Agri-Tech points to improve penetration, maintain uniform tillage depth and break plow pan.
- Attach leveling harrow to minimize secondary tillage.
- Operate at at least 5 m.p.h. at about 5" deep. Operate at a 10 to 20° angle to previous crop row.
- Use straight edge coulters rather than discs to minimize trash coverage. 22" diameter coulters are better than 20" coulters to reduce plugging or piling of residues on sandy ground.
- Follow with a high clearance cultivator or a one pass tillage tool (e.g. soil finisher).
- Avoid herbicides which may be tied up by residue.
- Increase seeding rate by 5 to 10% in corn residue.

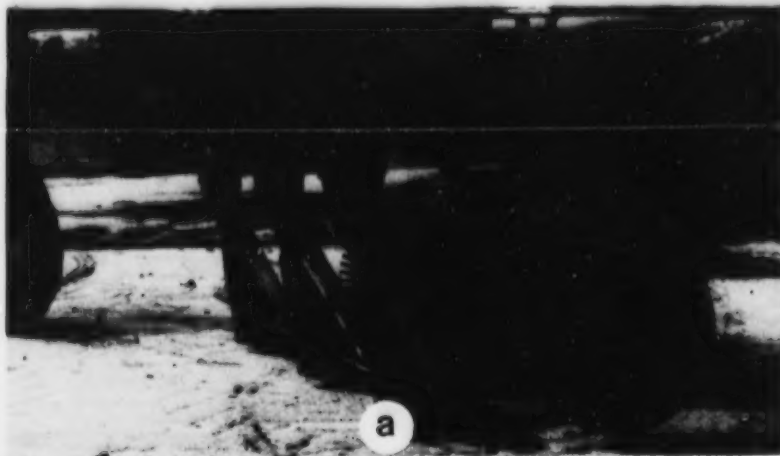
### Field Conditions of Use

Corn Heat Units: 3200  
 Soil Texture: sand to Brookston clay  
 Drainage: good on sand, fair on clay  
 Stoniness/Slope: no/flat to gently sloping  
 Crop Residue Types: corn, soybeans, wheat  
 Crops to be Planted: corn, soybeans, wheat

## OTHER MINIMUM-TILL EQUIPMENT

### MACHINE A

Make: Allis Chalmers Plow Frame  
 Size: 3 furrow — 16" bottoms  
 Year: (not available)  
 Horsepower required: 20 H.P./bottom on heavy clay



### Modifications/Attachments

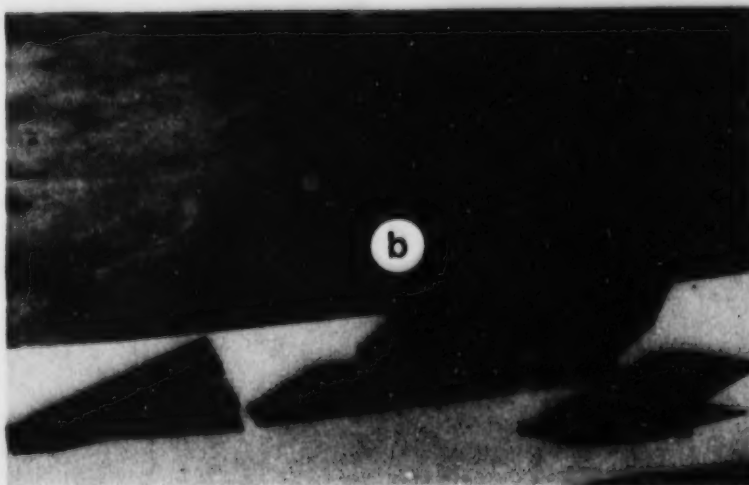
- a. 'Eagle' plow bottom (Eagle Manufacturing — \$250/bottom in 1988)
- b. Unassembled plow bottom

### Field Conditions of Use

Corn Heat Units: 2850  
 Soil Texture: clay loam  
 Drainage: good  
 Stoniness/Slope: no stones/gently sloping  
 Crop Residue Types: corn, wheat, soybeans, turnips  
 Crops to be Planted: corn, wheat, soybeans, turnips

### Practical Tips for Use

- i) Plow must be moved laterally so that the first bottom is in the right tractor wheel track.
- ii) Adjust wings up to reduce residue, or flatten to increase residue.
- iii) Work well at 8 to 9" deep; work at greater depth to break compacted soil (e.g. after turnips).
- iv) Do not use on green vegetation (e.g. wintergrass or clover).
- v) Follow in spring with land leveler and conservation planter.

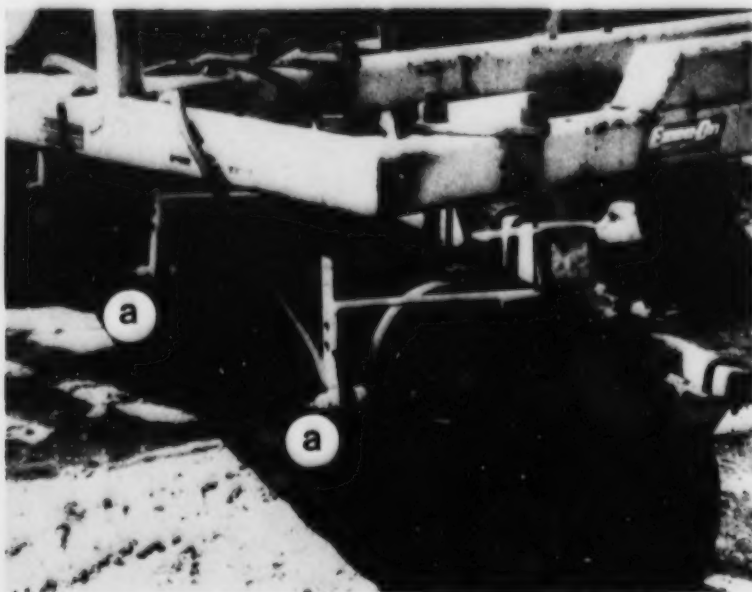




## OTHER MINIMUM-TILL EQUIPMENT — cont'd

### MACHINE B — HEAVY TANDEM DISC

Make: Ezee-on  
 Model: 1490-1500  
 Size: 18"  
 Year: 1984  
 Horsepower required: 150 H.P.



#### Modifications/Attachments

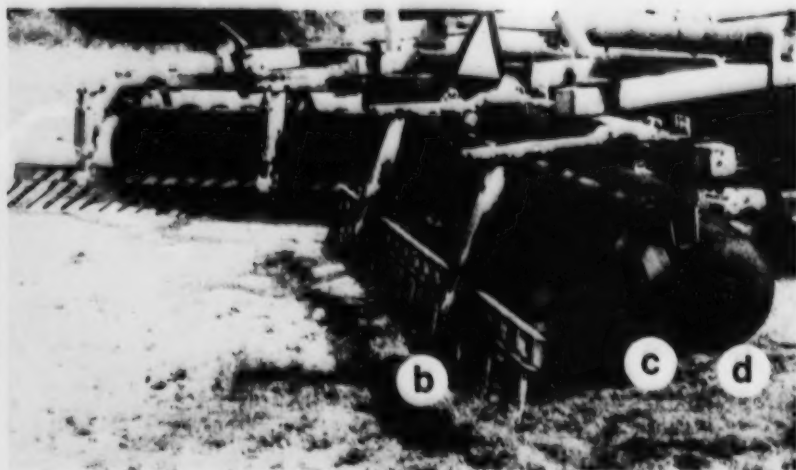
- a. weed spray attachment with 'Hardi' 3 point hitch sprayer (not shown)
- b. buster bar leveling device — 'Midwest' — \$600 in 1984
- c. 22" diameter disc and
- d. 17" diameter disc to prevent soil ridging with standard 26" disc

#### Field Conditions of Use

Corn Heat Units:	2650
Soil Texture:	sandy loam, loam
Drainage:	good
Stoniness/Slope:	some/gently sloping
Crop Residue Types:	corn and soybeans
Crops to be Planted:	corn and soybeans

#### Practical Tips for Use

- i) Use disc in spring (one or two passes) on untilled soil.
- ii) If buster bar is set too low it will gather residue.
- iii) Drive at 4 to 5 m.p.h. for good tilling action.
- iv) Before tillage, spot spray for weeds.

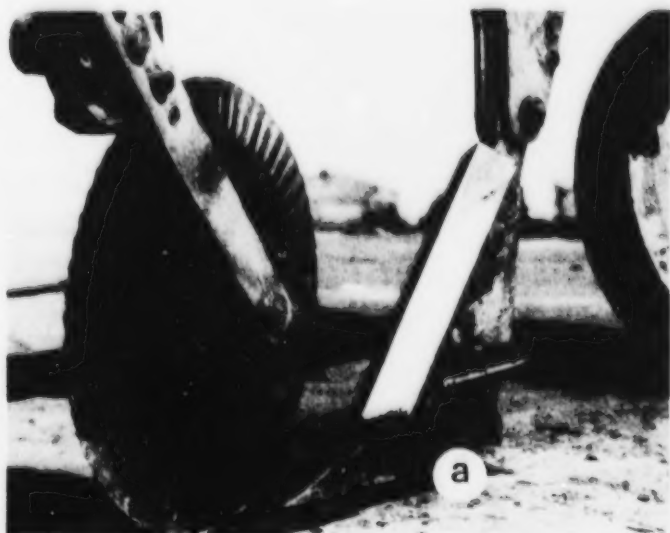
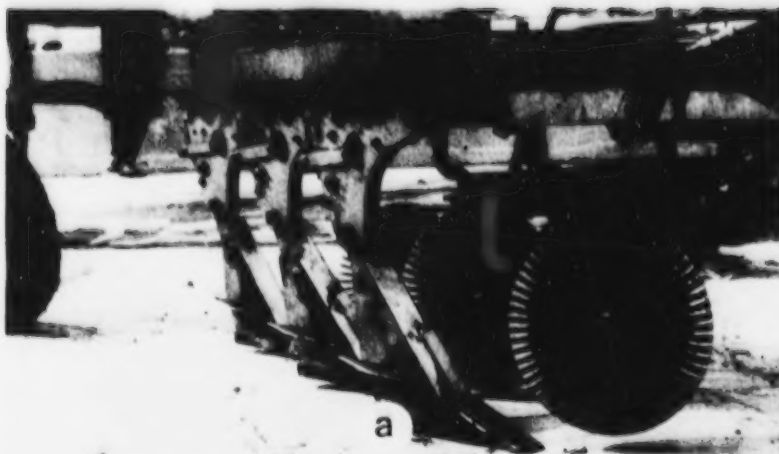




## OTHER MINIMUM-TILL EQUIPMENT

### MACHINE A

Make: Allis Chalmers Plow Frame  
Size: 3 furrow — 16" bottoms  
Year: (not available)  
Horsepower required: 20 H.P./bottom on heavy clay



### Modifications/Attachments

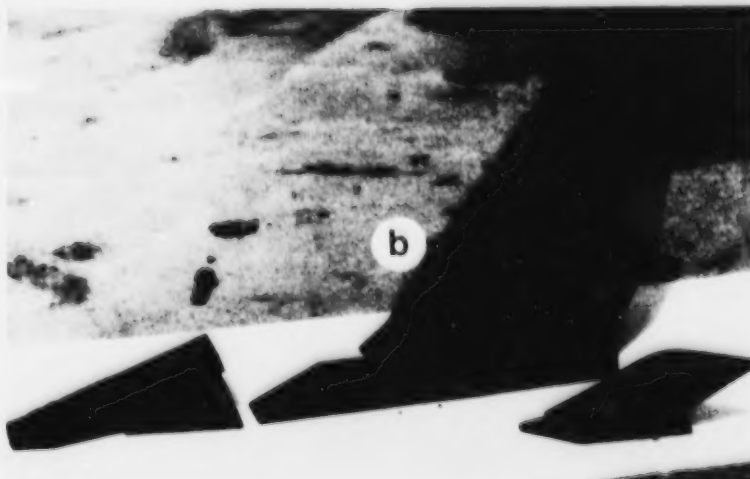
- a. 'Eagle' plow bottom (Eagle Manufacturing — \$250/bottom in 1988)
- b. Unassembled plow bottom

### Field Conditions of Use

Corn Heat Units:	2850
Soil Texture:	clay loam
Drainage:	good
Stoniness/Slope:	no stones/gently sloping
Crop Residue Types:	corn, wheat, soybeans, turnips
Crops to be Planted:	corn, wheat, soybeans, turnips

### Practical Tips for Use

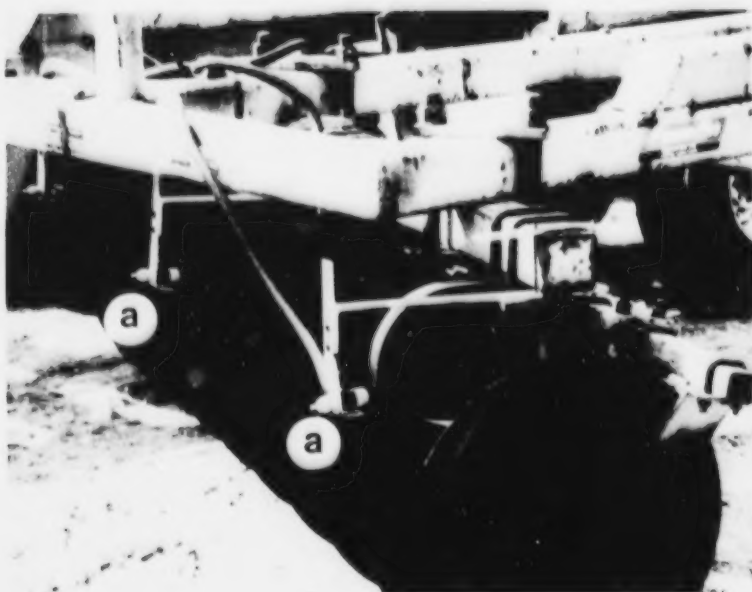
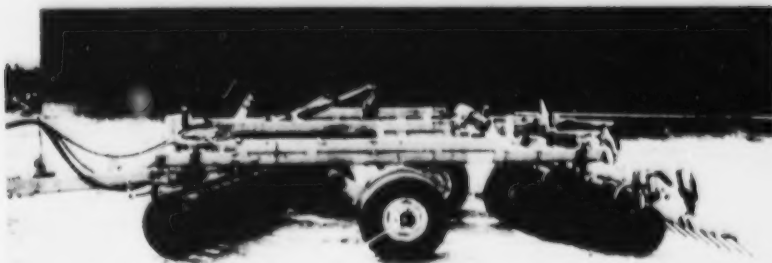
- i) Plow must be moved laterally so that the first bottom is in the right tractor wheel track.
- ii) Adjust wings up to reduce residue, or flatten to increase residue.
- iii) Works well at 6 to 8" deep; work at greater depth to break compacted soil (e.g. after turnips).
- iv) Do not use on green vegetation (e.g. twitchgrass or clover).
- v) Follow in spring with land leveler and conservation planter.



## OTHER MINIMUM-TILL EQUIPMENT — cont'd

### MACHINE B — HEAVY TANDEM DISC

Make: Ezee-on  
Model: 1490-1500  
Size: 18"  
Year: 1984  
Horsepower required: 150 H.P.



#### Modifications/Attachments

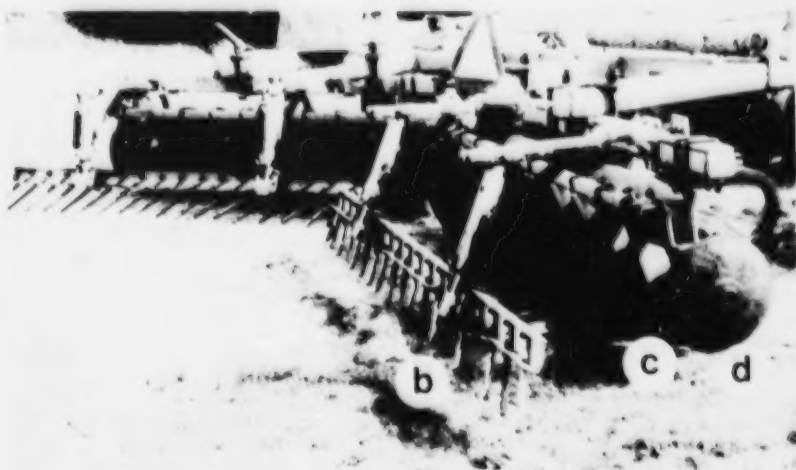
- a. weed spray attachment with 'Hardi' 3 point hitch sprayer (not shown)
- b. buster bar leveling device — 'Midwest' — \$600 in 1984
- c. 22" diameter disc and
- d. 17" diameter disc to prevent soil ridging with standard 26" disc

#### Field Conditions of Use

Corn Heat Units:	2650
Soil Texture:	sandy loam, loam
Drainage:	good
Stoniness/Slope:	some/gently sloping
Crop Residue Types:	corn and soybeans
Crops to be Planted:	corn and soybeans

#### Practical Tips for Use

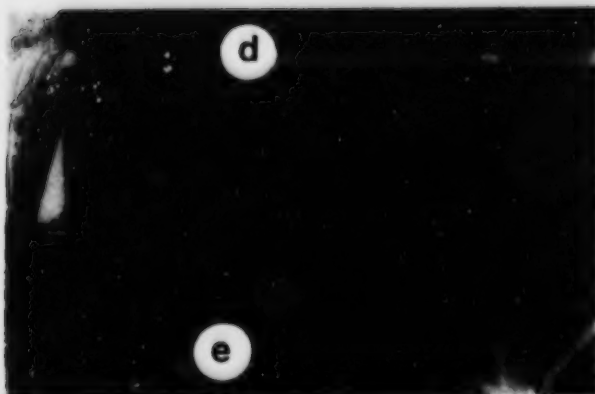
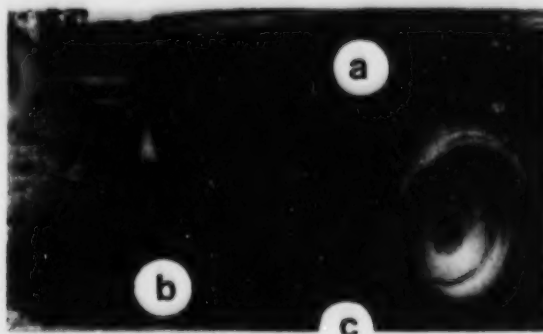
- i) Use disc in spring (one or two passes) on untilled soil.
- ii) If buster bar is set too low it will gather residue.
- iii) Drive at 4 to 5 m.p.h. for good tilling action.
- iv) Before tillage, spot spray for quackgrass.



## CONSERVATION SEED DRILLS

### DRILL A

Make: Great Plains  
 Model: Solid Stand 10 (end wheel drive)  
 Size: 10 foot; 7.5" row spacing  
 Year: 1988  
 Horsepower required: 60 H.P.



### Modifications/Attachments

- a. grass seed box
- b. double V-configured press wheels for minimum till conditions — \$55/row
- c. single 2" x 13" press wheel for no-till conditions
- d. bracket for weights
- e. 18" diameter 1" bubble coulter staggered (offset) on planter frame running in line with seed opener (standard setup)

### Practical Tips for Use

- i) 1" bubble coulter chosen instead of 1/2" ripple or 2" fluted. Loosens enough soil for seed opener without throwing soil out of seed trench.
- ii) If narrow coulter selected, select a narrow press wheel to ensure press wheels don't just ride up on firm crusted soil.
- iii) If broadcasting fertilizer, apply before planting so same is incorporated when planting.
- iv) Staggered seeding with no-till residue.

### Field Conditions of Use

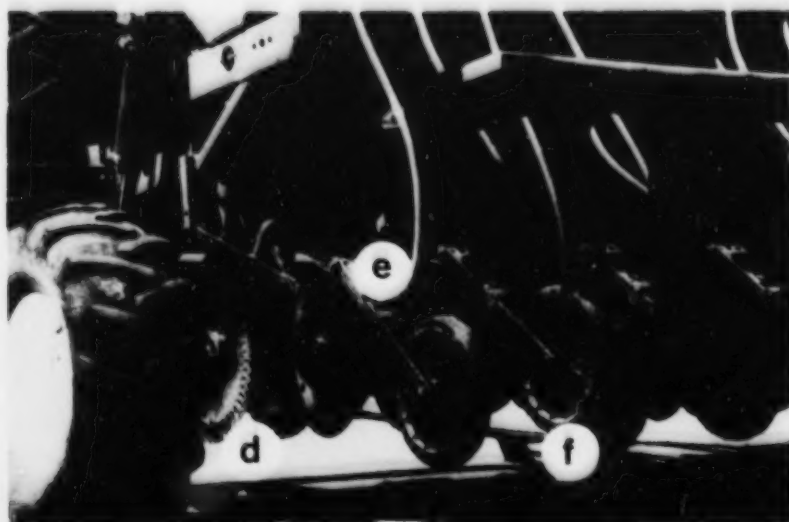
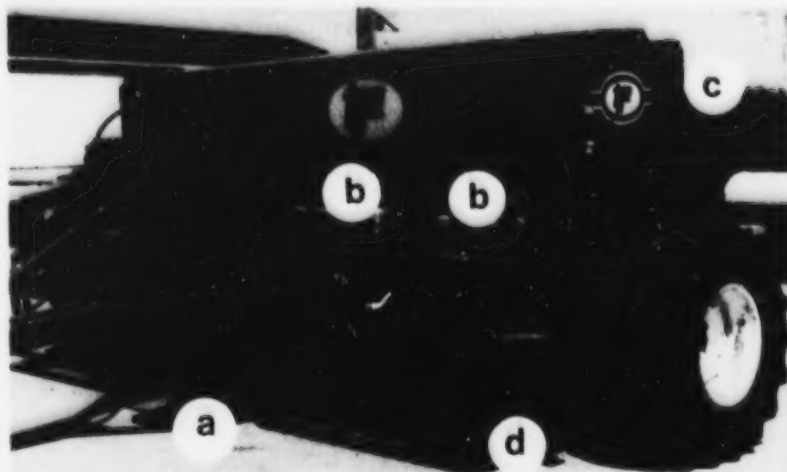
Corn Heat Units: 2850  
 Soil Texture: silty clay to coarse sand  
 Drainage: good  
 Stoniness/Slope: variable/gentle to 15%  
 Crop Residue Types: corn, soybeans, wheat, barley  
 Crops to be Planted: wheat, barley, soybeans



## CONSERVATION SEED DRILLS — cont'd

### DRILL B

Make: Tye Stubble Drill  
 Size: 10 foot, 15 run at 7.5" run  
 spacing  
 Year: 1985  
 Horsepower required: 95 H.P. (75 H.P.  
 on flat land)



### Modifications/Attachments

- a. ripple drive coulters
- b. brackets for weights (up to 600 lbs total in hard ground)
- c. seed hopper; dry fertilizer hopper (removed for repair)
- d. ripple coulters (attached to drill frame in front of seed openers)
- e. seeding units staggered (offset) on frame
- f. press wheels — 'Tye' (\$80 per run — 2" x 13" wheel and bracket)

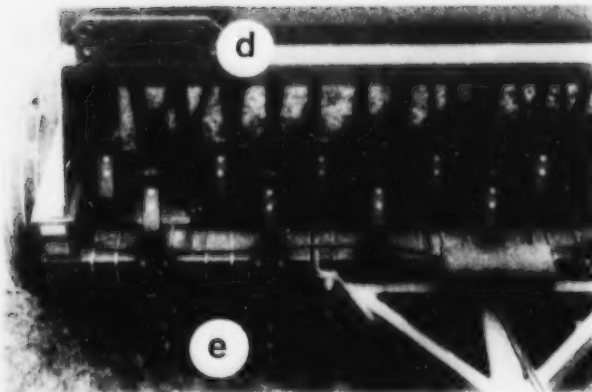
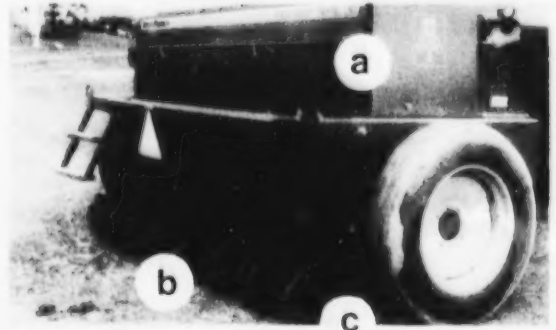
### Field Conditions of Use

Corn Heat Units: 2950  
 Soil Texture: Fox sand to Brookston clay  
 Drainage: excellent  
 Stoniness/Slope: none/up to 20%  
 Crop Residue Types: soybeans, corn, wheat  
 Crops to be Planted: wheat, soybeans, corn

## CONSERVATION SEED DRILLS

### DRILL A

Make: Great Plains  
Model: Solid Stand 10 (end wheel drive)  
Size: 10 foot; 7.5" row spacing  
Year: 1988  
Horsepower required: 60 H.P.



### Modifications/Attachments

- a. grass seed box
- b. double V-configured press wheels for minimum till conditions — \$55/row
- c. single 2" x 13" press wheel for no-till conditions
- d. bracket for weights
- e. 18" diameter 1" bubble coulters staggered (offset) on planter frame running in line with seed opener (standard setup)

### Practical Tips for Use

- i) 1" bubble coulters chosen instead of 1/2" ripple or 2" fluted. Loosens enough soil for seed opener without throwing soil out of seed trench.
- ii) If narrow coulters selected, select a narrow press wheel to ensure press wheels don't just ride up on firm untilled soil.
- iii) If broadcasting fertilizer, apply before planting so some is incorporated when planting.
- iv) Staggered seeding units assist residue flow.

### Field Conditions of Use

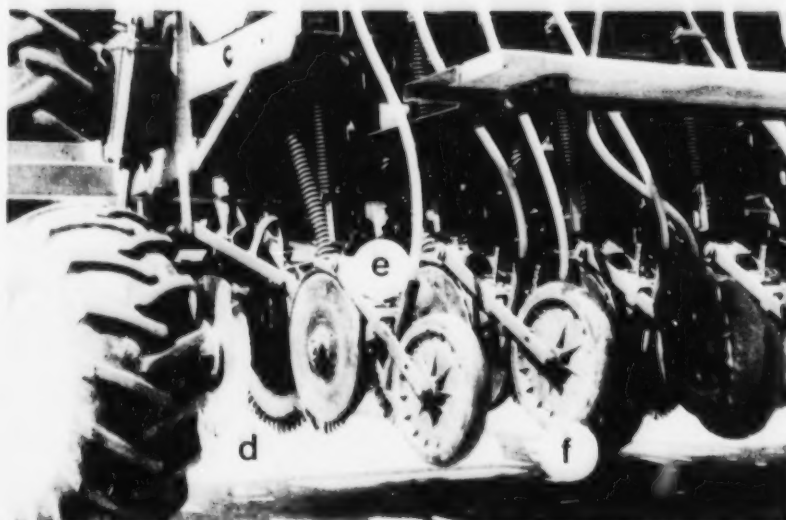
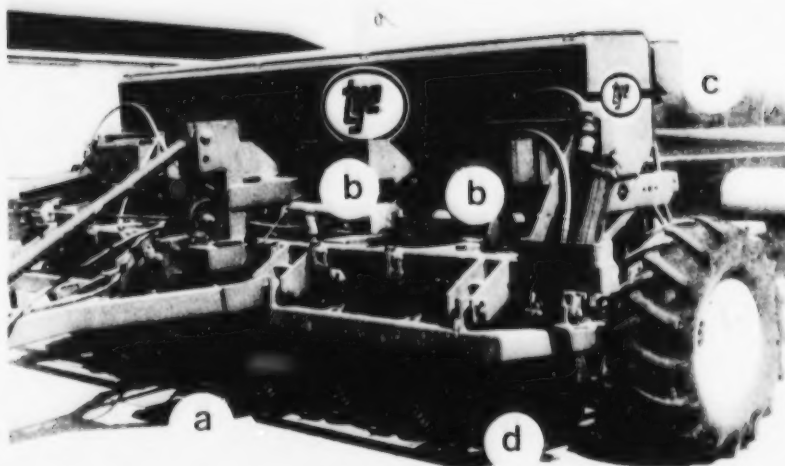
Corn Heat Units: 2850  
Soil Texture: silty clay to coarse sand  
Drainage: good  
Stoniness/Slope: variable/gentle to 15%  
Crop Residue Types: corn, soybeans, wheat, barley  
Crops to be Planted: wheat, barley, soybeans



## CONSERVATION SEED DRILLS — cont'd

### DRILL B

Make: Tye Stubble Drill  
Size: 10 foot, 15 run at 7.5" run spacing  
Year: 1985  
Horsepower required: 95 H.P. (75 H.P. on flat land)



### Modifications / Attachments

- a. ripple drive coulters
- b. brackets for weights (up to 600 lbs total in hard ground)
- c. seed hopper; dry fertilizer hopper (removed for repair)
- d. ripple coulters (attached to drill frame in front of seed openers)
- e. seeding units staggered (offset) on frame
- f. press wheels — 'Tye' (\$80 per run — 2" x 13" wheel and bracket)

### Practical Tips for Use

- i) Keep drive coulters as narrow a ripple as possible, as fluted will throw up too much wet soil.
- ii) Never straddle a dead furrow. The planter will lose its drive.
- iii) For soybeans, replace tillage ripple coulters with 1" fluted coulters and single press wheel with double press wheels.
- iv) Remove lower spring on press wheel tightener to relieve excess bouncing.
- v) When no-tilling into corn, stalk chop after harvest.

### Field Conditions of Use

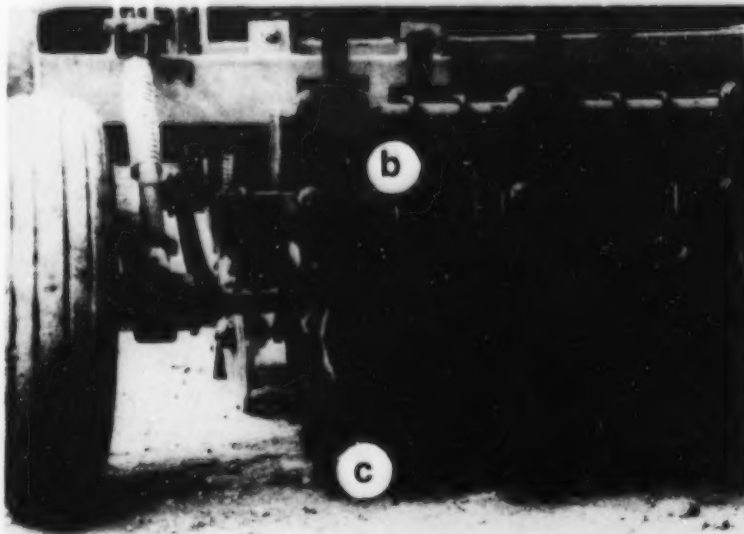
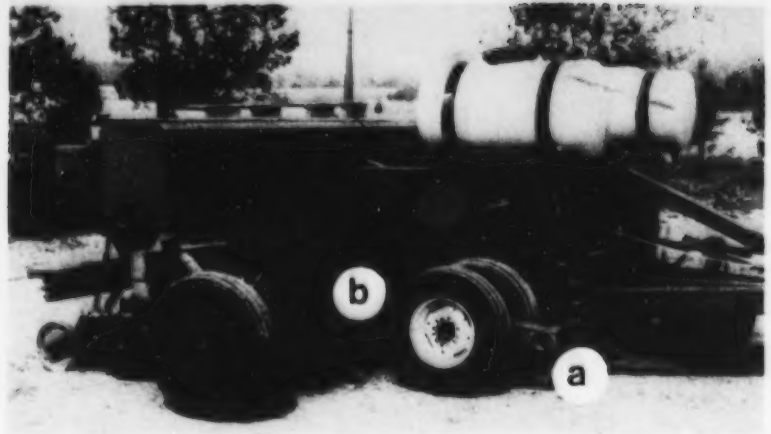
Corn Heat Units:	2950
Soil Texture:	Fox sand to Brookston clay
Drainage:	excellent
Stoniness/Slope:	none/up to 20%
Crop Residue Types:	soybeans, corn, wheat
Crops to be Planted:	wheat, soybeans, corn



## CONSERVATION SEED DRILL — cont'd

### DRILL C

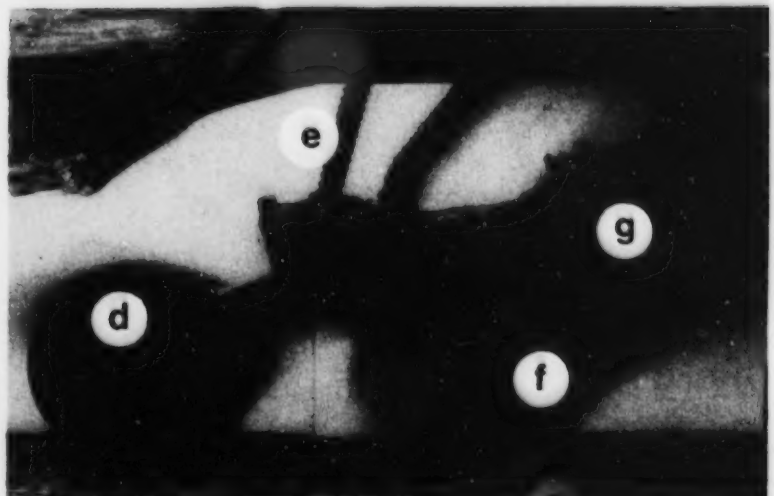
Make: Best  
Model: 1508-A  
Size: 15 foot, 24 run at 7.5" run  
spacing  
Year: 1984  
Horsepower required: 110 H.P. with caddy



### Modifications/Attachments

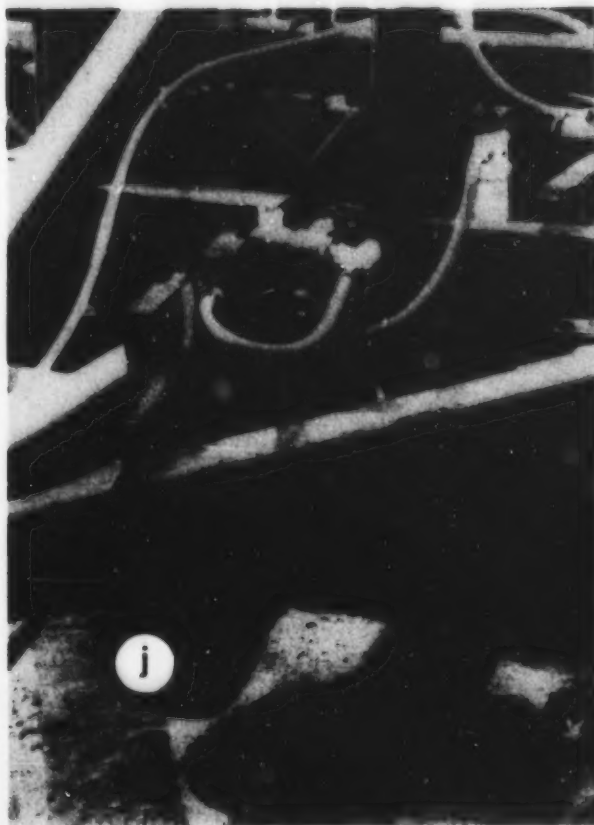
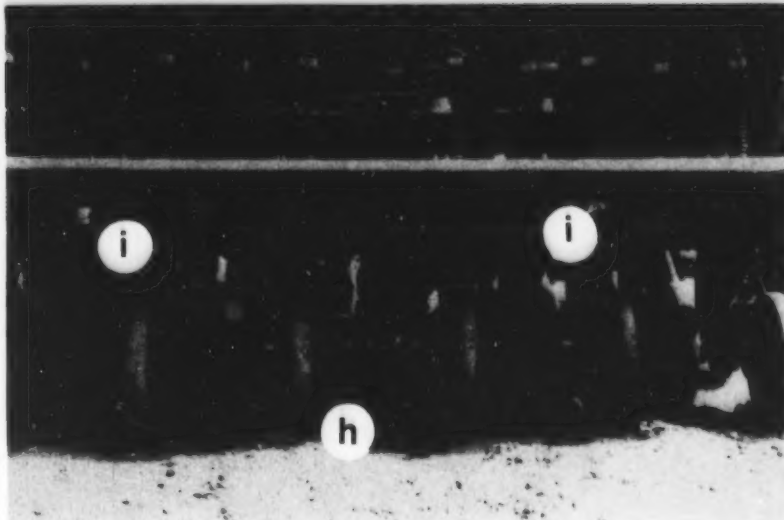
- a. caddy unit with no-till coulters on toolbar and tanks for liquid fertilizer or weight (caddy with no-till coulters — \$7,000)
- b. tool bar on caddy unit
- c. 18" diameter 1" fluted no-till coulters running in front of staggered (offset) seeding units

- d. 2" x 13" single press wheel
- e. adjustable down pressure springs
- f. 'Acra-Plant' seed openers (2 offset discs with internal shoe to form seed trench)
- g. parallel linkage system (helps stabilize seeding unit)



**DRILL C - cont'd**

- h. single press wheels on staggered (offset) seeding units
- i. weed spray plumbing and nozzles 'Tee Jet' (flood jet type) \$50 plus saddle tanks and pump
- j. ground driven pump for liquid fertilizer mounted on caddy frame



**Field Conditions of Use**

Corn Heat Units:	2750
Soil Texture:	mostly silt loam
Drainage:	poor to excellent
Stoniness/Slope:	few/gently to moderately rolling
Crop Residue Types:	corn, wheat, soybeans
Crops to be Planted:	canola, small grains, soybeans, white beans

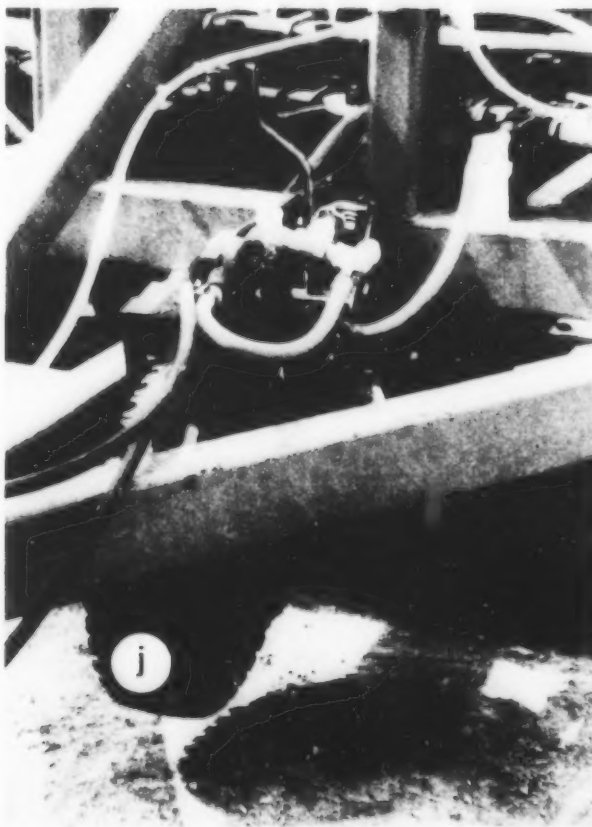
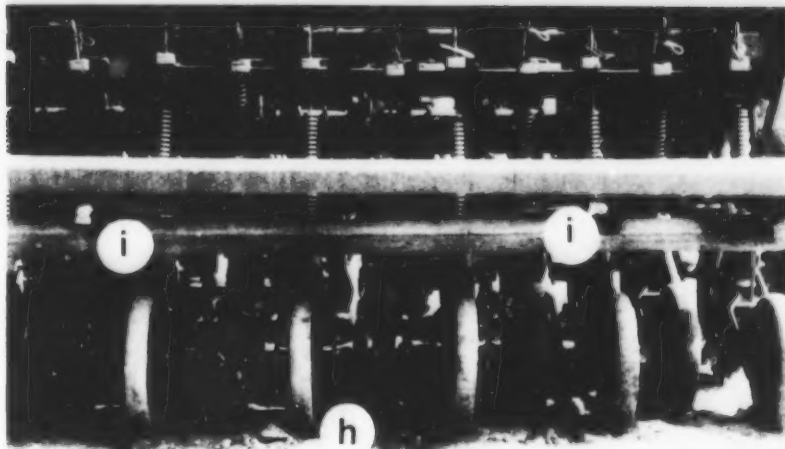
**Practical Tips for Use**

- i) Only run tillage coulters as deep as necessary for planting; if too deep, soil dries out.
- ii) Do not plant when soil is wet as seed trench may open.
- iii) Recommend planting on angle to old corn rows, or residue plugging may occur.
- iv) Use more contact herbicides and fewer residual types (more environmentally desirable tool).
- v) Weed spraying with drill pass gives good weed control (in a dry year, herbicides are activated by contacting moist soil).



## DRILL C - cont'd

- h. single press wheels on staggered (offset) seeding units
- i. weed spray plumbing and nozzles 'Tee Jet' (flood jet type) \$50 plus saddle tanks and pump
- j. ground driven pump for liquid fertilizer mounted on caddy frame



## Field Conditions of Use

Corn Heat Units:	2750
Soil Texture:	mostly silt loam
Drainage:	poor to excellent
Stoniness/Slope:	few/gently to moderately rolling
Crop Residue Types:	corn, wheat, soybeans
Crops to be Planted:	canola, small grains, soybeans, white beans

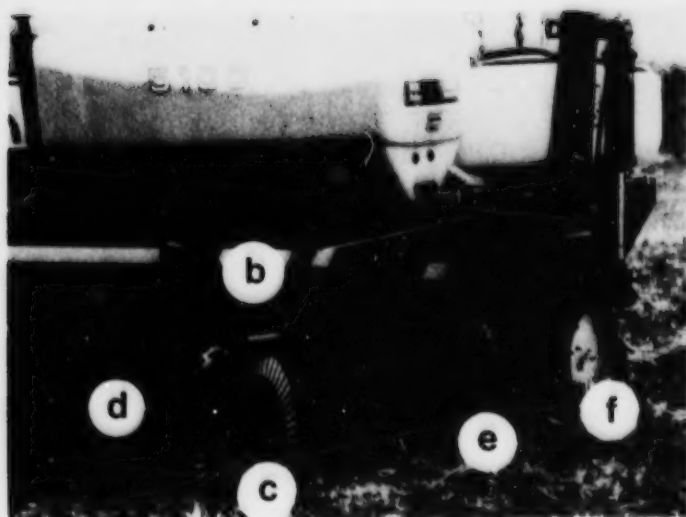
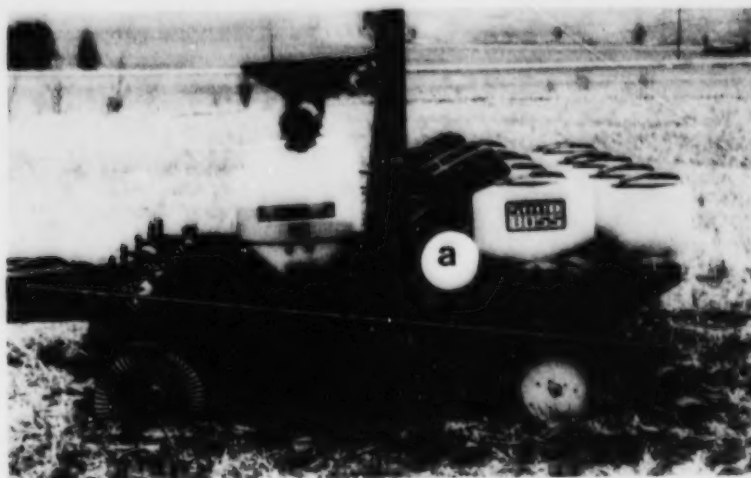
## Practical Tips for Use

- i) Only run tillage coulters as deep as necessary for planting; if too deep, soil dries out.
- ii) Do not plant when soil is wet as seed trench may open.
- iii) Recommend planting on angle to old corn rows, or residue plugging may occur.
- iv) Use more contact herbicides and fewer residual types (more environmentally desirable too!).
- v) Weed spraying with drill pass gives good weed control (in a dry year, herbicides are activated by contacting moist soil).

## CONSERVATION ROW CROP PLANTERS

### PLANTER A

Make: White Farm Equipment  
 Model: 5100 Seed Boss  
 Size: 6 row — 30" row spacing  
 Year: 1982  
 Horsepower required: 70 H.P. (12 H.P./row)



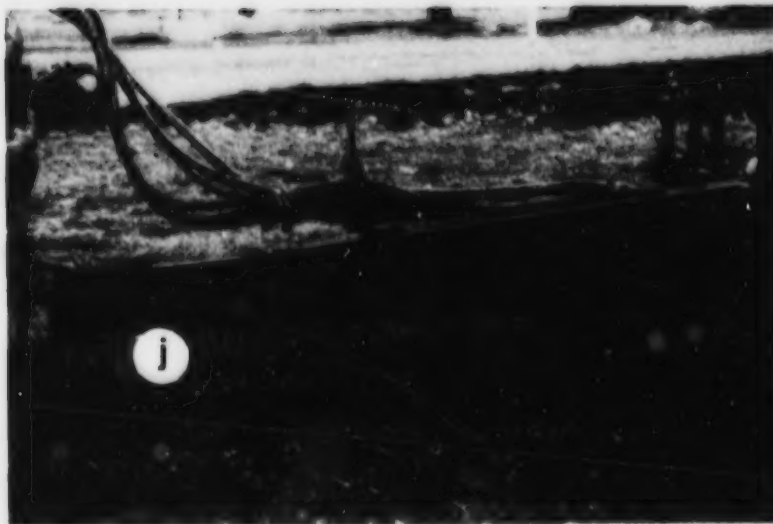
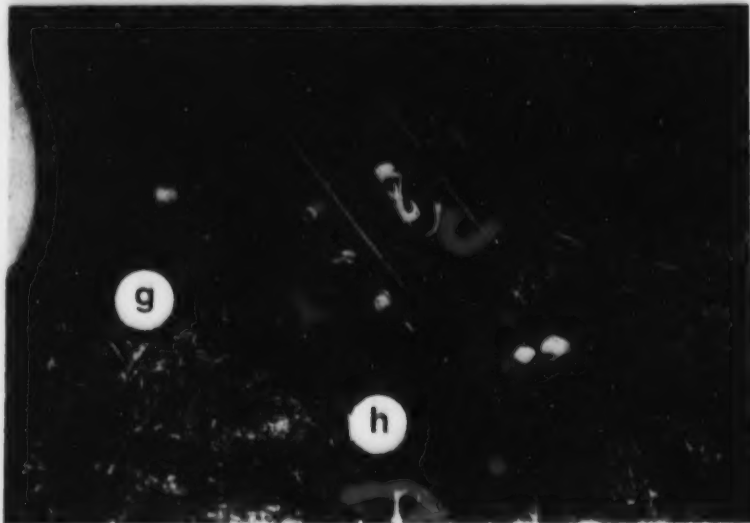
### Modifications/Attachments

- a. 4 weight brackets (\$15 each) plus weights mounted on planter frame
- b. tool bar (\$90 for materials)
- c. 20" diameter ripple coulters ('White' — \$240 each) in line with fertilizer openers
- d. "corn stalk" or "trash" bar (\$20 for material)
- e. 'White Trash Tamer' units (ripple coulter plus notched trash whippers — \$320 per unit)
- f. depth control wheels on seeding unit (with oscillating depth stops)

## CONSERVATION ROW CROP PLANTERS — cont'd

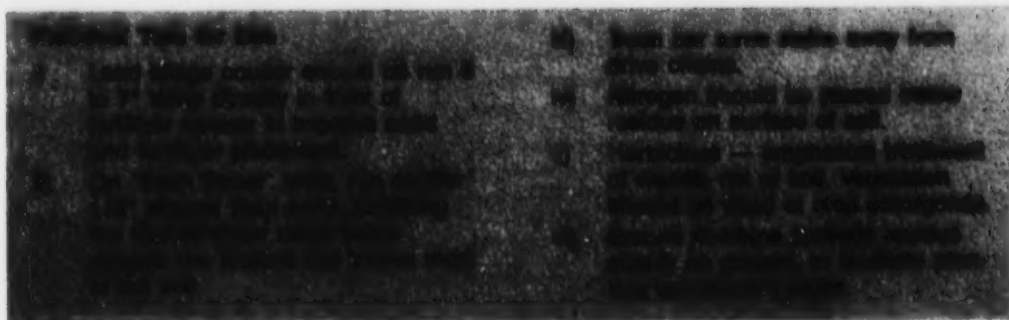
### PLANTER A - cont'd

- g. in-furrow insecticide tube
- h. 3 wheel press wheel attachment ('White' — slightly higher cost relative to standard press wheel)
- i. notched blades on marker leaves more visible mark
- j. 20" hitch extension required when tractor dual wheels used (\$80 materials)

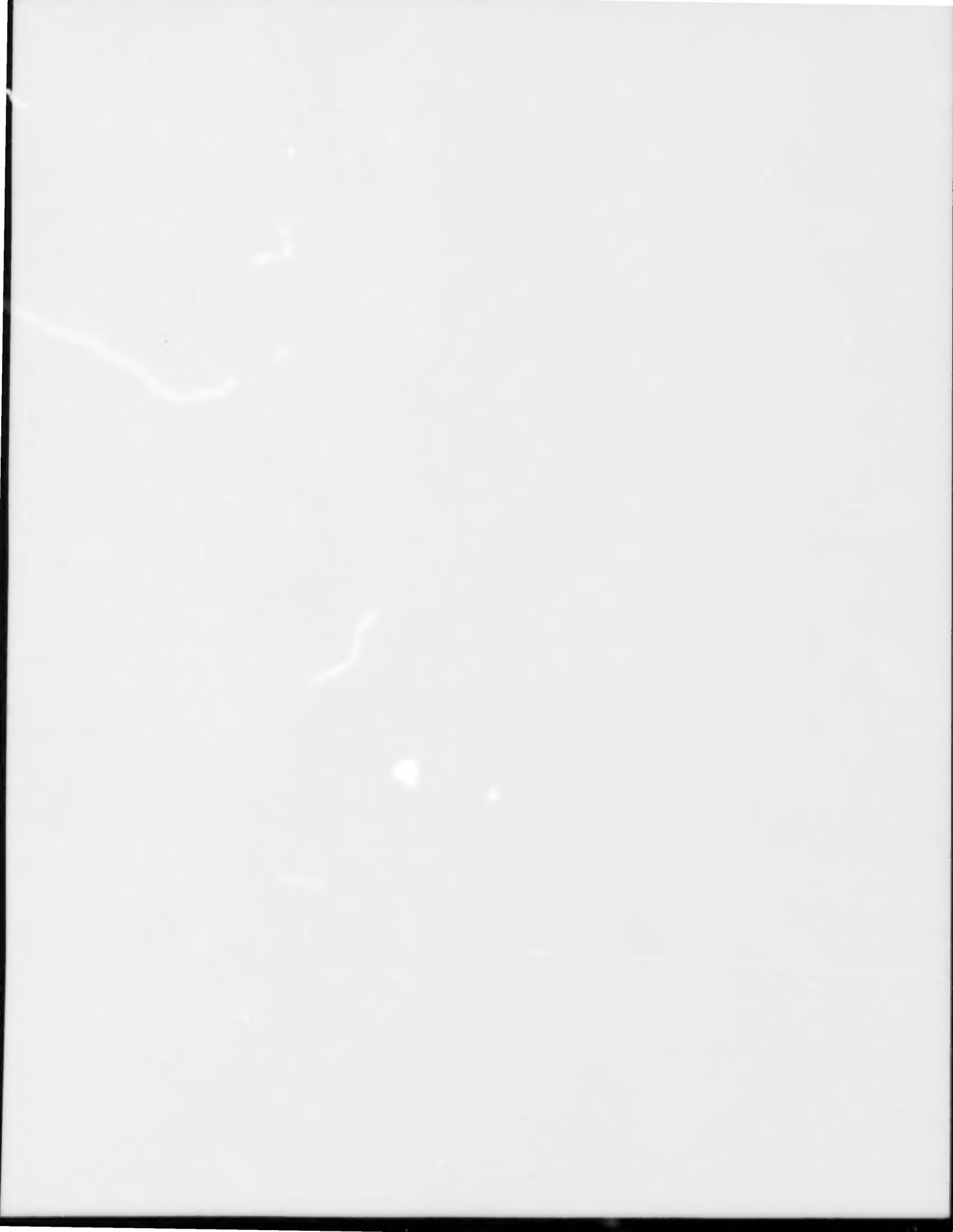


### Field Conditions of Use

Corn Heat Units: 2850  
 Soil Texture: silty clay to coarse sands  
 Drainage: good  
 Stoniness/Slope: yes/gentle to 15%  
 Crop Residue Types: corn, soybeans, wheat, barley  
 Crops to be Planted: corn, soybeans

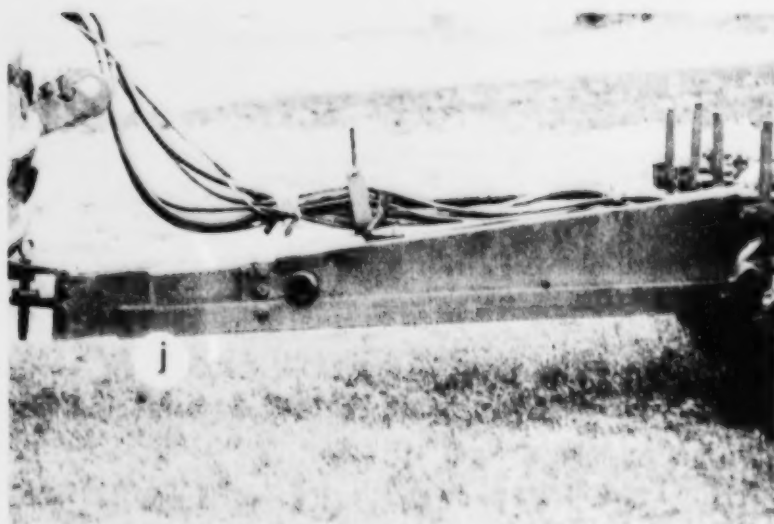
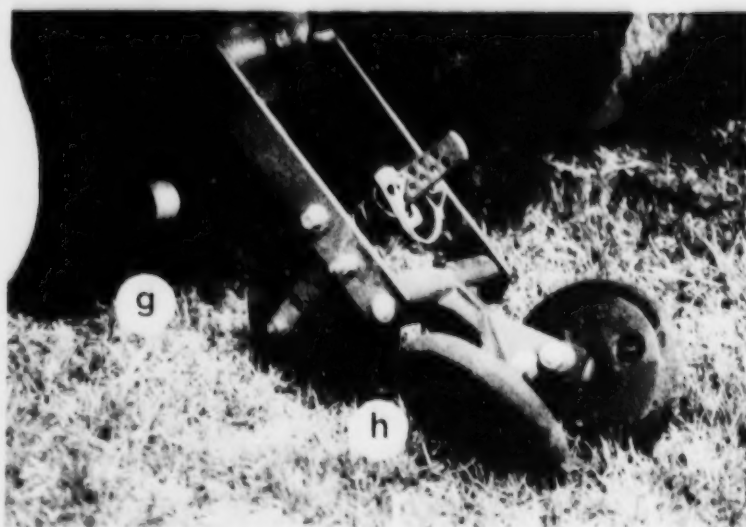






## PLANTER A - cont'd

- g. in-furrow insecticide tube
- h. 3 wheel press wheel attachment ('White' — slightly higher cost relative to standard press wheel)
- i. notched blades on marker leaves more visible mark
- j. 20" hitch extension required when tractor dual wheels used (\$80 materials)



## Field Conditions of Use

Corn Heat Units: 2850  
 Soil Texture: silty clay to coarse sands  
 Drainage: good  
 Stoniness/Slope: yes/gentle to 15%  
 Crop Residue Types: corn, soybeans, wheat, barley  
 Crops to be Planted: corn, soybeans

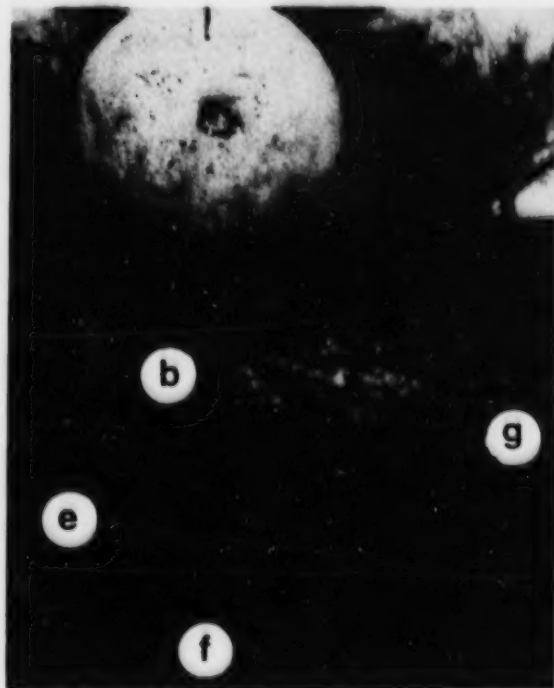
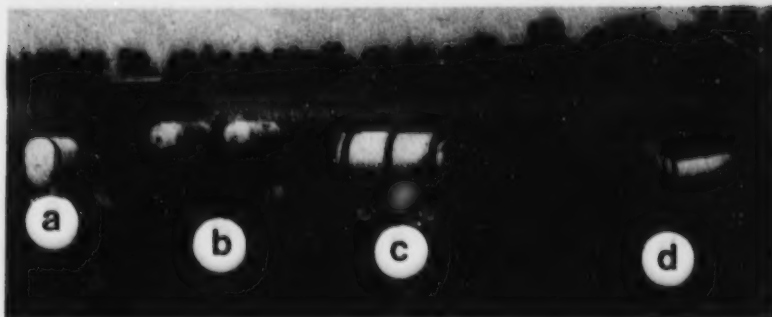
## Practical Tips for Use

- i) Lead tillage coulters should be run 6 to 7" deep directly in front of fertilizer opener to improve seed and fertilizer placement.
- ii) On 'Trash Tamer' units, run coulters 1/2" deeper than seed. Notching the trashwhipper discs helps remove the residue but leaves most of the soil.
- iii) Trash bar turns stalks away from drive chains.
- iv) Nitrogen should be placed below residue on surface of soil.
- v) Herbicides — emphasize treatment of weeds, not of soil. Vegetation should be dead at crop emergence.
- vi) Ensure combine spreads residue evenly on ground, to facilitate planting subsequent crops.

## CONSERVATION ROW CROP PLANTERS — cont'd

### PLANTER B

Make: Deutz-Allis  
 Model: 385  
 Size: 6 row — 30" row spacing  
 Year: 1989  
 Horsepower required: 120 to 150 H.P.  
 (20 to 25 H.P./row)



### Modifications/Attachments

- a. saddle tanks — herbicide
- b. 3 point hitch toolbar (6" x 6" tube steel/angle iron — \$720) with ballast tanks for weight
- c. liquid fertilizer tank — 28% nitrogen
- d. planter
- e. lengthened tractor tongue (homemade — \$50) to pull fertilizer tank

- f. 17" diameter 2" fluted tillage coulters 'Rawson' (\$315 each x 12 = \$3,780)
- g. hydraulic liquid fertilizer pump 'Char-Lynn'



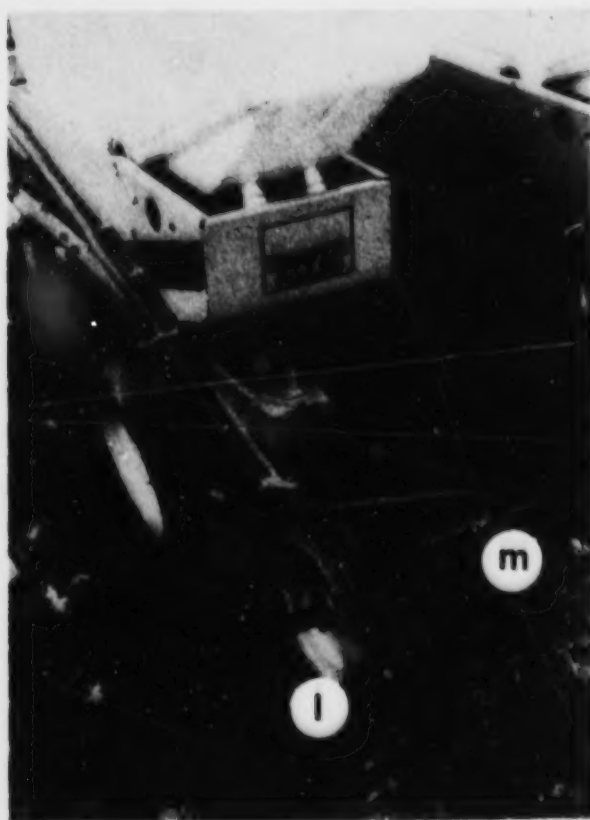
## CONSERVATION ROW CROP PLANTERS — cont'd

### PLANTER B - cont'd

- h. liquid fertilizer coulters
- i. no-till ripple coulters
- j. furrowing discs (trashwhippers)
- k. 'Quadra Disk' planting unit
- l. press wheel
- m. herbicide spray attachment

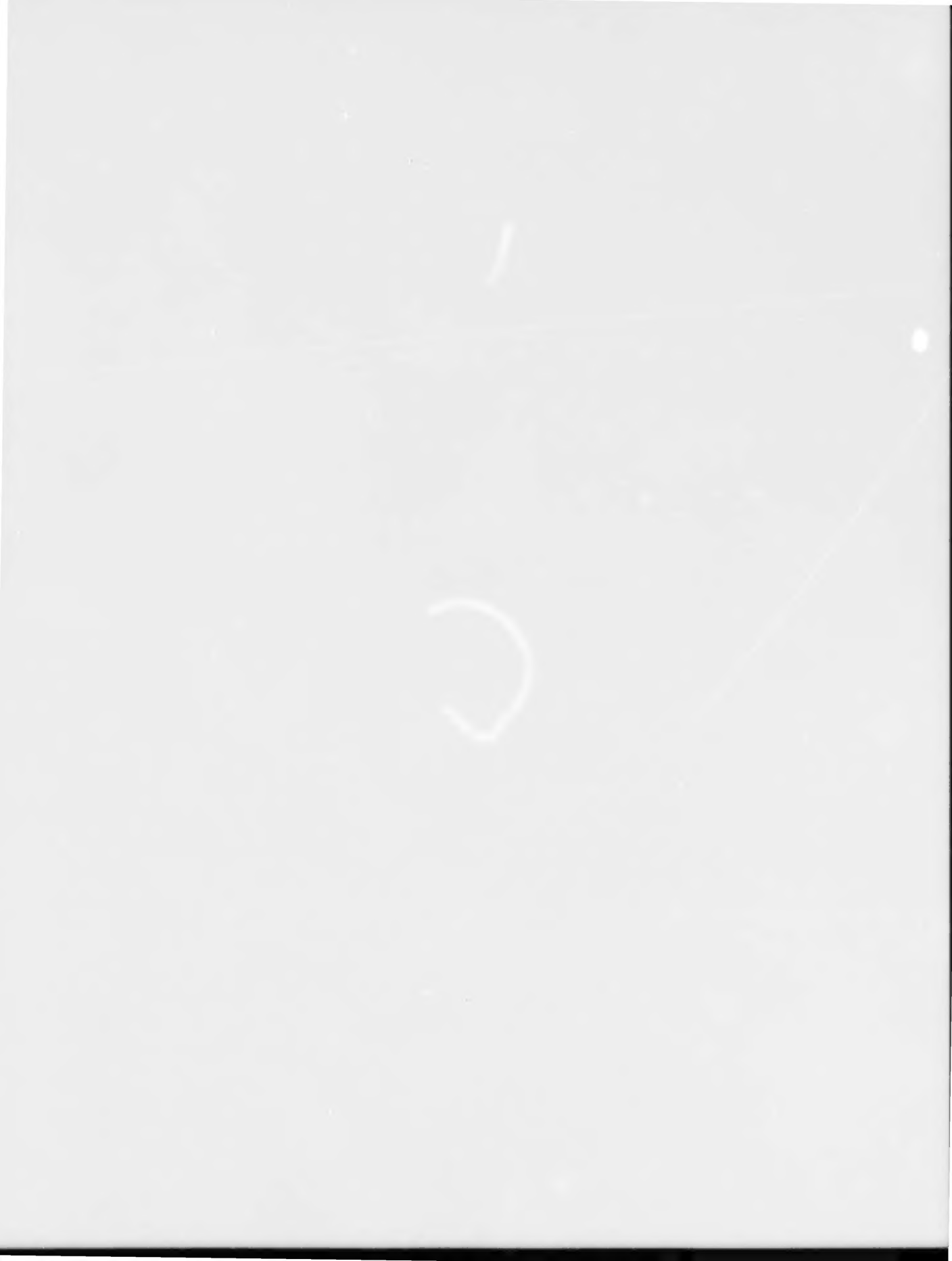
### Field Conditions of Use

Corn Heat Units: 2800  
Soil Texture: sandy loam  
Drainage: excellent  
Stoniness/Slope: some/moderately sloping  
Crop Residue Types: corn, soybeans  
Crops to be Planted: soybeans, corn



### Practical Tips for Use

- i) 'Rauwen' coulters set to work soil 4 to 8" on each side of the seed.
- ii) Liquid fertilizer coulters line up with one of the 'Rauwen' coulters for good penetration (4" deep for nitrogen placement).
- iii) Because soils are high in P, the required R is broadcast following wheat (wheat plowed and disked in spring; 4 years of corn follow).
- iv) Use rain drop nozzles for spraying on windy days. Spraying on moist earth when planting is a help in a dry year.
- v) Lengthened tongue on tractor and fertilizer wagon so toolbar doesn't hit wagon.
- vi) Spot spray tallgrass before planting.



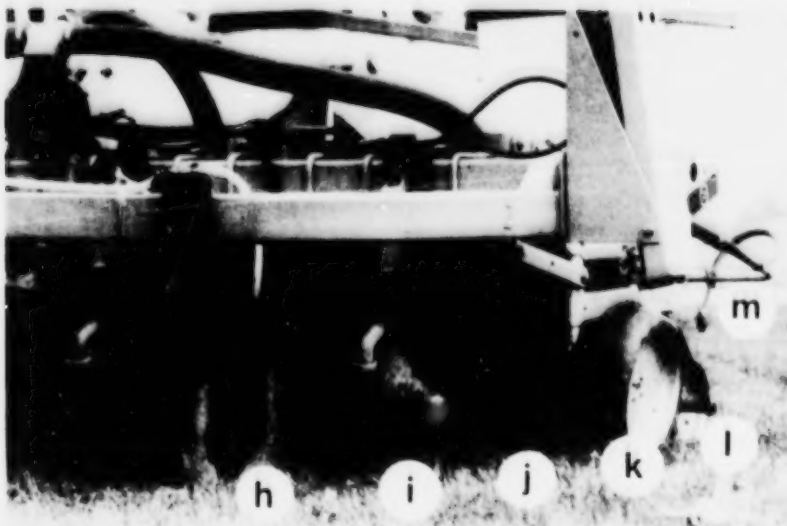
## CONSERVATION ROW CROP PLANTERS — cont'd

### PLANTER B - cont'd

- h. liquid fertilizer coulters
- i. no-till ripple coulters
- j. furrowing discs (trashwhippers)
- k. 'Quadra Disk' planting unit
- l. press wheel
- m. herbicide spray attachment

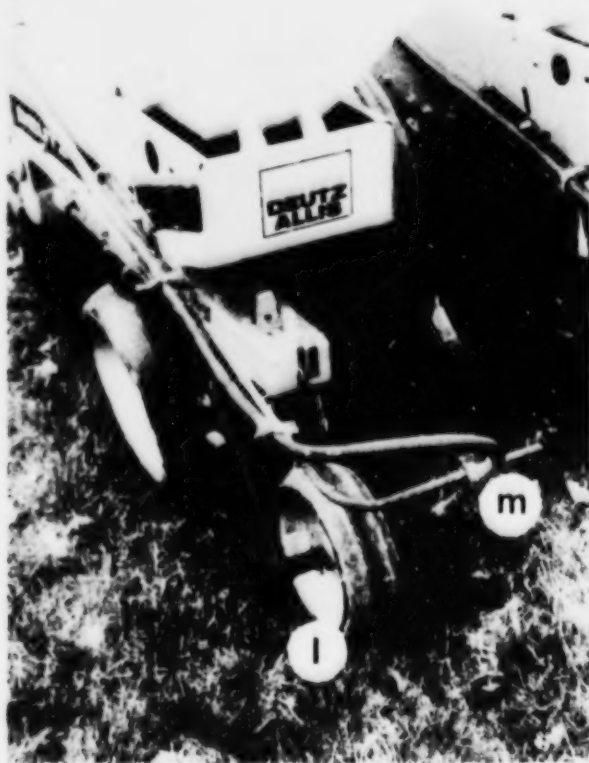
#### Field Conditions of Use

Corn Heat Units: 2800  
Soil Texture: sandy loam  
Drainage: excellent  
Stoniness/Slope: some/moderately sloping  
Crop Residue Types: corn, soybeans  
Crops to be Planted: soybeans, corn



#### Practical Tips for Use

- i) 'Rawson' coulters set to work soil 4 to 5" on each side of the seed.
- ii) Liquid fertilizer coulters line up with one of the 'Rawson' coulters for good penetration (4" deep for nitrogen placement).
- iii) Because soils are high in P, the required K is broadcast following wheat (chisel plowed and disked in spring); 4 years of corn follow.
- iv) Use rain drop nozzles for spraying on windy days. Spraying on moist earth when planting is a help in a dry year.
- v) Lengthened tongue on tractor and fertilizer wagon so toolbar doesn't hit wagon.
- vi) Spot spray twitchgrass before planting.

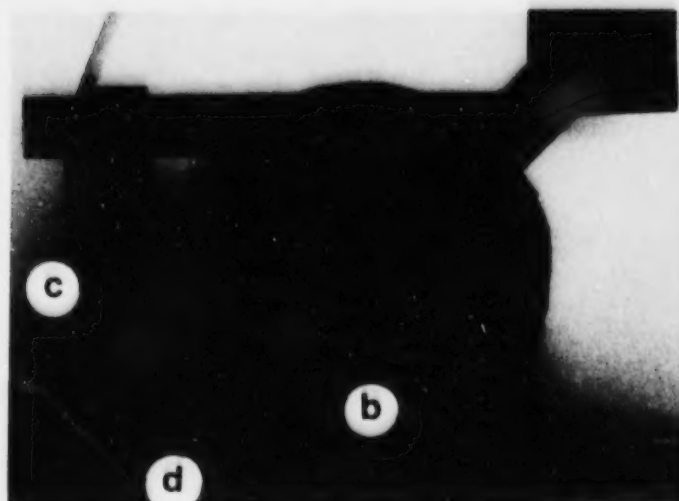
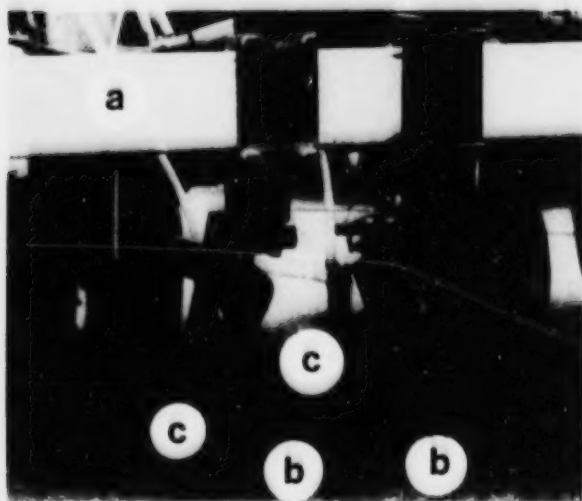




## CONSERVATION ROW CROP PLANTERS — cont'd

### PLANTER C

Make: New Idea/Kinzie  
Model: 900 Series with double  
frame  
Size: 6 row — 38" row spacing  
Year: 1987  
Horsepower required: 120 H.P.  
(20 H.P./row)



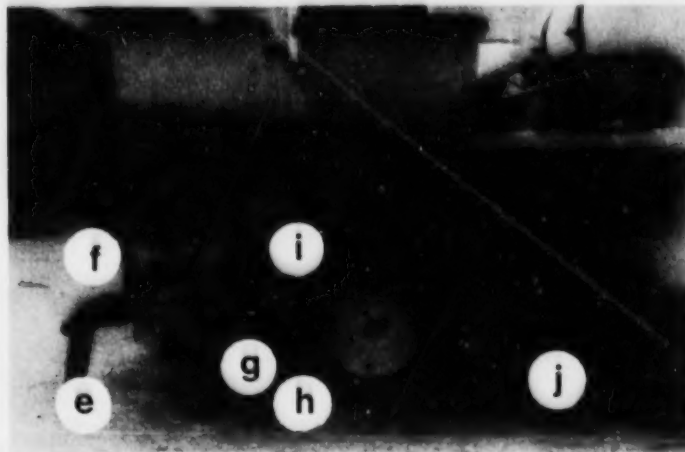
### Modifications/Attachments

- a. (front view) toolbar for tillage coulters - homemade, 3" x 6" tubular steel (\$250 for material)
- b. 2" fluted tillage coulters ('Till-Tech') with fertilizer injection units — \$300/coulter or \$600/row

- c. liquid fertilizer injection units (one for 28% nitrogen; one for 10-34-0) - complete liquid fertilizer system including tanks and plumbing (\$1200, used)
- d. hardened tip on bottom of injector point for better wear and to keep dirt out of the end of the fertilizer tube

## CONSERVATION ROW CROP PLANTERS — cont'd

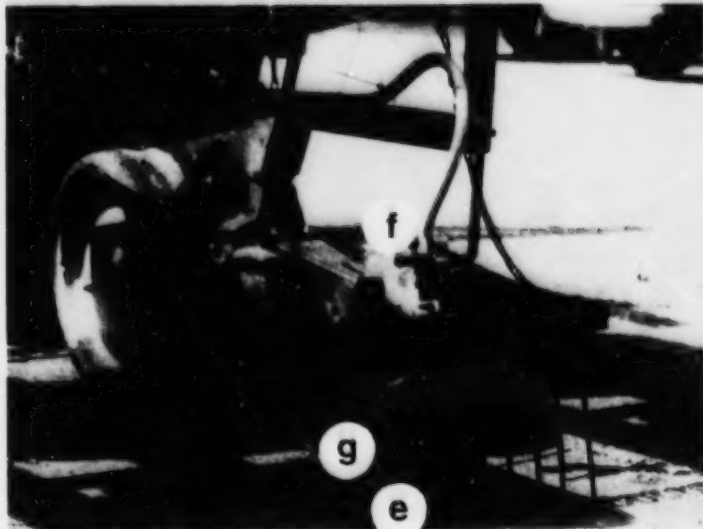
### PLANTER C - cont'd



- e. finger tines to help incorporate herbicide and cover seed trench
- f. band spray attachment (\$2,000 homemade)
- g. rubber press wheels
- h. in-furrow rootworm insecticide tube
- i. 'Depth-A-Matic' (SI Manufacturing) to stabilize depth on planting unit
- j. 'Yetter' 1" x 17" diameter bubble coulter running 1/4" deeper than seed placement

### Field Conditions of Use

Corn Heat Units: 3300  
 Soil Texture: gravel to clay  
 Drainage: fair to excellent  
 Stoniness/Slope: some/flat to moderately sloping  
 Crop Residue Types: corn, wheat, clover  
 Crops to be Planted: corn

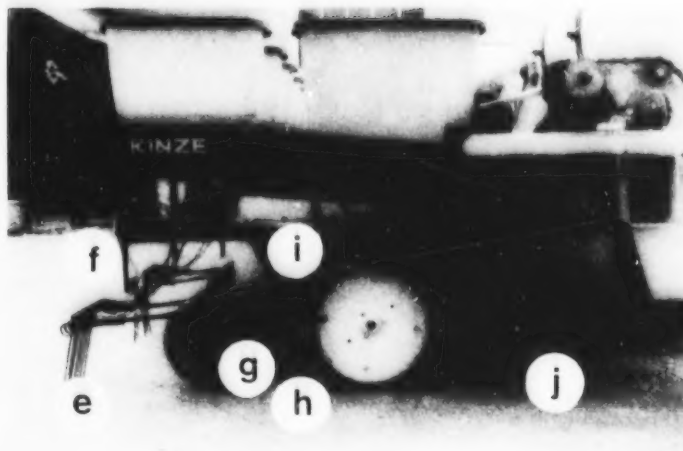


### Preplant Tips for Use

- i) Do enough tillage with coulters so that closing unit can be run normally.
- ii) Chemically kill weeds before planting until system is learned. Do not plant into a lot of green material.
- iii) Plant when soil is dry (will crumble in hand).
- iv) Use less insecticide on early developing perennial weeds.
- v) Run first stage coulters 4" deep with 7" between them:  
 - front 12-14" - 2 1/2" apart  
 - back 12-14" - 4 1/2" apart  
 - 18" in front



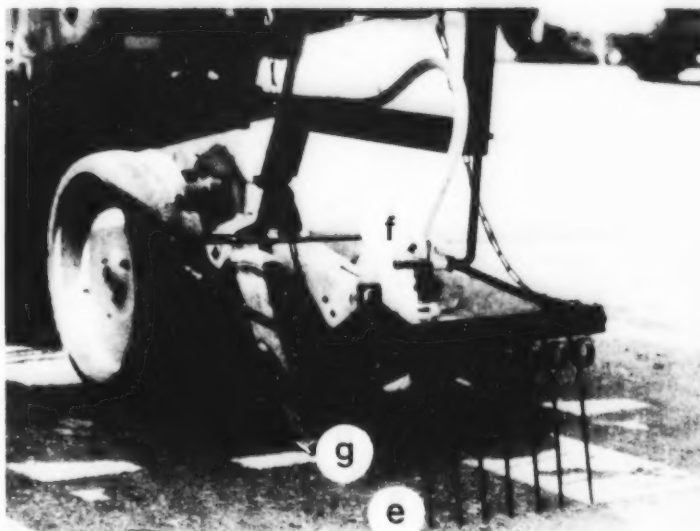
PLANTER C - cont'd



- e. finger tines to help incorporate herbicide and cover seed trench
- f. band spray attachment (\$2,000 homemade)
- g. rubber press wheels
- h. in-furrow rootworm insecticide tube
- i. 'Depth-A-Matic' (SI Manufacturing) to stabilize depth on planting unit
- j. 'Yetter' 1" x 17" diameter bubble coulters running 1/4" deeper than seed placement

Field Conditions of Use

Corn Heat Units: 3300  
 Soil Texture: gravel to clay  
 Drainage: fair to excellent  
 Stoniness/Slope: some/flat to moderately sloping  
 Crop Residue Types: corn, wheat, clover  
 Crops to be Planted: corn



Practical Tips for Use

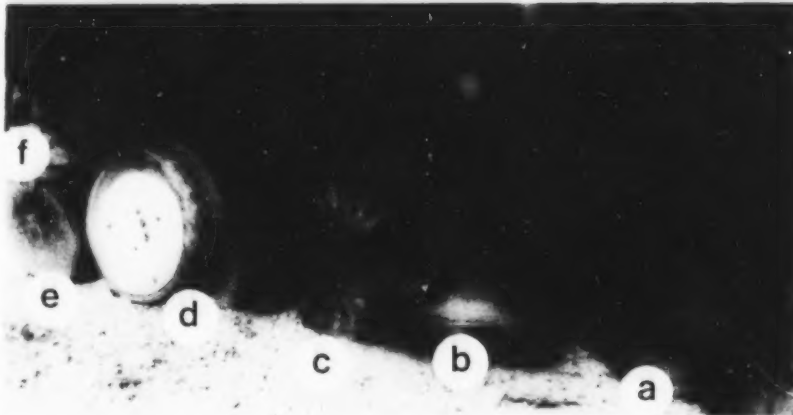
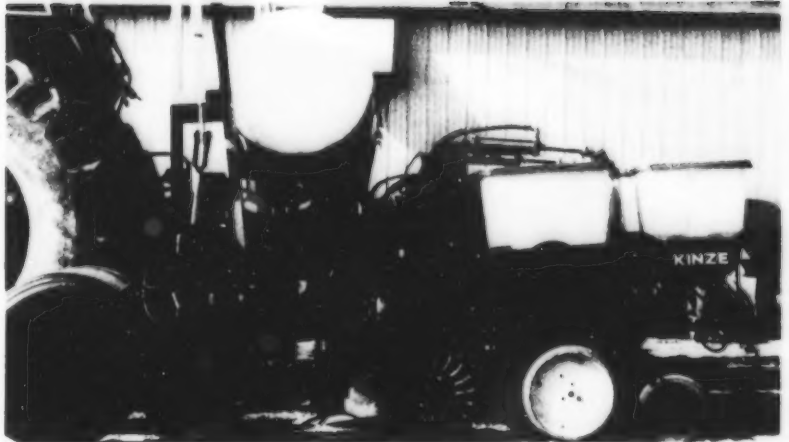
- i) Do enough tillage with coulters so that seeding units can be run normally.
- ii) Run fluted tillage coulters 4" deep with 7" between them:
  - inject 10-34-0 2 1/2" from row
  - inject 28% N 4 1/2" from row (50 lb N/ac)
- iii) Chemically kill weeds before planting until system is learned. Do not plant into a lot of green material.
- iv) Plant when soil is dry (will crumble in hand).
- v) Use wick weeder on early developing perennial weeds.

## RIDGE-TILL SYSTEMS

### SYSTEM A

#### 1. RIDGE-TILL PLANTER

Make: Hiniker/New Idea/Kinze  
Size: 6 row — 30" row spacing  
Year: 1984  
Horsepower required: 90 H.P.  
(15 H.P./row)

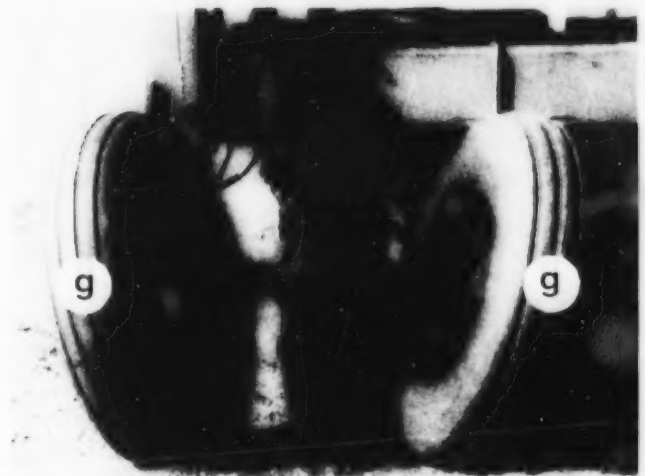


#### Modifications/Attachments

- a. smooth coulter with depth control band
- b. ridge cleaning unit (horizontal rotating disk with wing deflectors)
- c. 'Yetter' 1" bubble coulter (17" diameter) with heavy duty down-pressure springs — \$300/row
- d. 'Depth-A-Matic' depth control wheel on seeding unit — \$30/row
- e. rubber press wheels
- f. band spray attachment
- g. ridge-hugging guide wheels

#### Practical Tips for Use

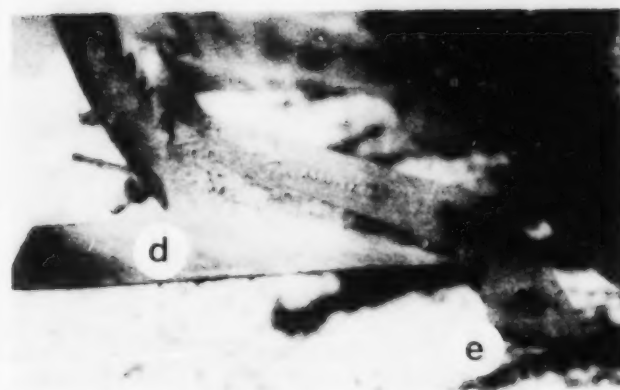
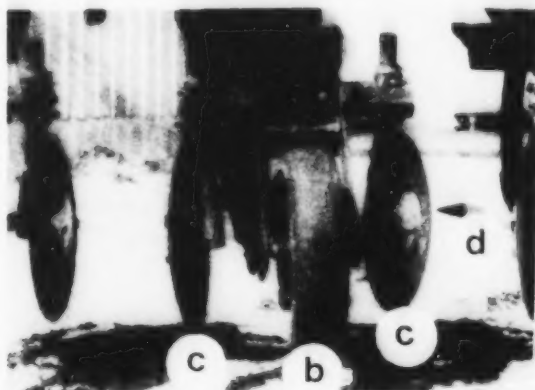
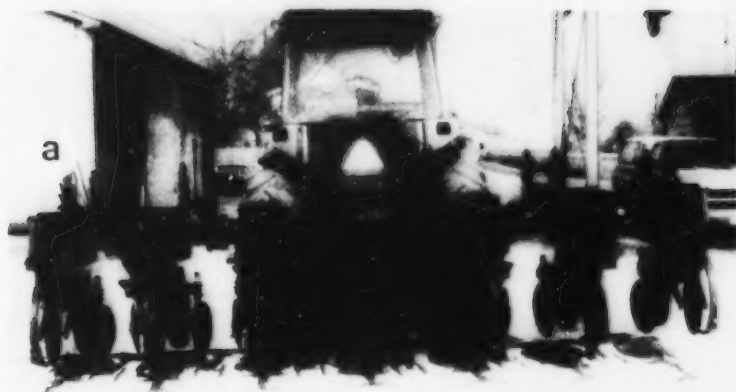
- i) Keep all attachments properly aligned so planter stays on ridge.
- ii) Use ridge-hugging guide wheels to keep planter on ridge.
- iii) Ridge cleaners work best when residue is dry.
- iv) Use burn-down herbicide prior to planting; at planting, band 15" of herbicide until experience is gained, then decrease width of band.
- v) Combine and grain buggy wheel spacing must follow row centres.



## SYSTEM A — cont'd

### 2. RIDGE-TILL CULTIVATOR

Make: Hiniker  
 Model: Econotil 6307  
 Size: 6 row — 30" row spacing  
 Year: 1984  
 Horsepower required: 15 H.P./row  
 (cultivator lift weight  
 determines tractor size  
 requirements)



### Modifications/Attachments

- a. rotary hoe (function as crop shields)
- b. depth control wheel
- c. weeding discs

- d. ridging sweep blade
- e. 'Agri-Tech' hardened point (\$25 each)  
 mounted on ridging sweep

### Practical Tips for Use

- i) Add 'Agri-Tech' points to get good penetration in firm soil.
- ii) Do not use in wet soil because weeds will not be killed.
- iii) Use of hydraulic cylinder on top 3 point hitch link is very important in varying soils.
- iv) Use rotary hoes as crop shields to protect crop. Run spiders backwards to avoid residue build up.
- v) Do not use weeding discs when building ridges.
- vi) Band spray when cultivating.

### Field Conditions of Use (System A)

Corn Heat Units: 3300  
 Soil Texture: Brookston clay to Berrien sand  
 Drainage: Good  
 Stoniness/Slope: none/flat to gently sloping  
 Crop Residue Types: corn, soybeans, winter wheat  
 Crops to be Planted: corn, soybeans, winter wheat

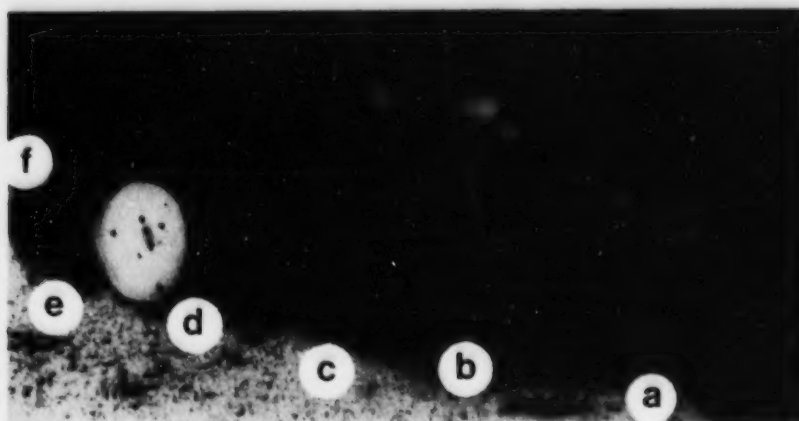


## RIDGE-TILL SYSTEMS

### SYSTEM A

#### 1. RIDGE-TILL PLANTER

Make: Hiniker/New Idea/Kinze  
Size: 6 row — 30" row spacing  
Year: 1984  
Horsepower required: 90 H.P.  
(15 H.P./row)

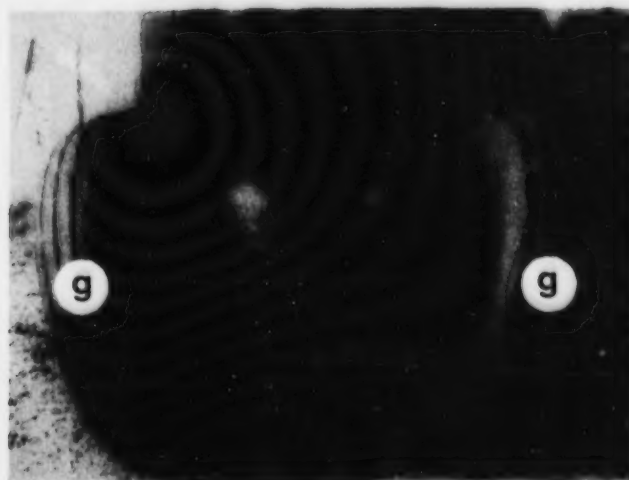


#### Modifications/Attachments

- a. smooth coulters with depth control band
- b. ridge cleaning unit (horizontal rotating disk with wing deflectors)
- c. 'Yetter' 1" bubble coulters (17" diameter) with heavy duty down-pressure springs — \$300/row
- d. 'Depth-A-Matic' depth control wheel on seeding unit — \$30/row
- e. rubber press wheels
- f. band spray attachment
- g. ridge-hugging guide wheels

#### Feedback Tips for Use

- i) Keep all attachments properly aligned so planter stays on ridge.
- ii) Use ridge-hugging guide wheels to keep planter on ridge.
- iii) Ridge cleaners work best when residue is dry.
- iv) Use burn-down herbicide prior to planting; at planting, band 15" of herbicide until experience is gained, then decrease width of band.
- v) Combine and grain buggy wheel spacing must follow row centers.

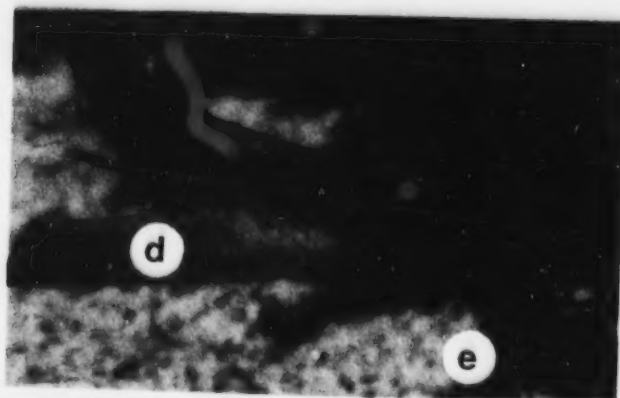
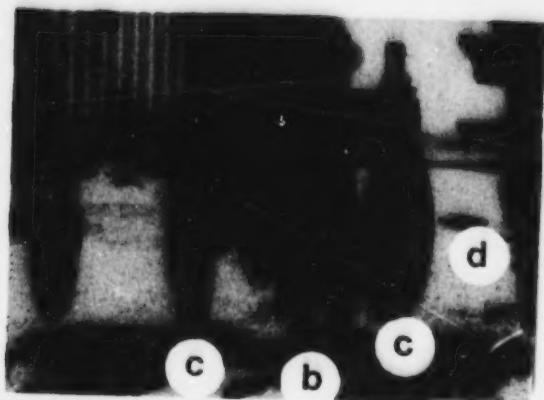


## RIDGE-TILL SYSTEMS — cont'd

### SYSTEM A — cont'd

#### 2. RIDGE-TILL CULTIVATOR

Make: Hiniker  
 Model: Econotill 6307  
 Size: 6 row — 30" row spacing  
 Year: 1984  
 Horsepower required: 15 H.P./row  
 (cultivator lift weight  
 determines tractor size  
 requirements)



#### Modifications/Attachments

- a. rotary hoe (function as crop shields)
- b. depth control wheel
- c. weeding discs

- d. ridging sweep blade
- e. 'Agri-Tech' hardened point (\$25 each)  
 mounted on ridging sweep

#### Practical Tips for Use

- i) Add 'Agri-Tech' points to get good penetration in firm soil.
- ii) Do not use in wet soil because weeds will not be killed.
- iii) Use of hydraulic cylinder on top & point hitch link is very important in varying soils.
- iv) Use rotary hoe as crop shields to protect crop. Run spiders backwards to avoid residue build up.
- v) Do not use weeding discs when cultivating ridges.
- vi) Drive slowly when cultivating.

#### Field Conditions of Use (System A)

Corn Heat Units: 3300  
 Soil Texture: Brookston clay to Berrien sand  
 Drainage: Good  
 Stoniness/Slope: none/flat to gently sloping

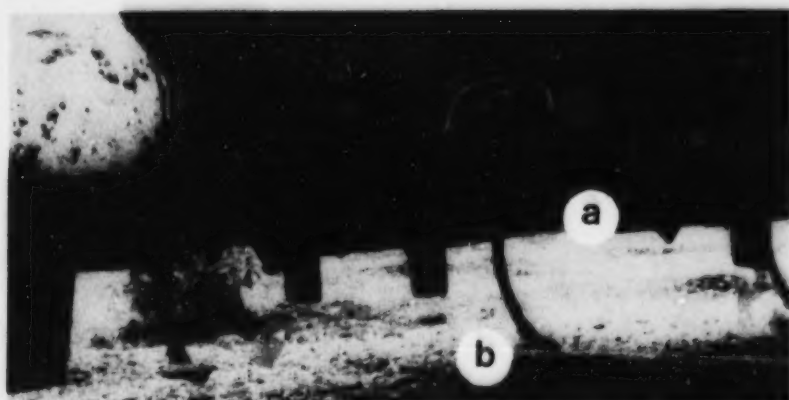
Crop Residue Types: corn, soybeans, winter wheat  
 Crops to be Planted: corn, soybeans, winter wheat

## RIDGE-TILL SYSTEMS — cont'd

### SYSTEM B

#### 1. POWER MULCHER

Make: Johnson  
Model: MC 830  
Size: 8 row — 30" row spacing  
Year: 1984  
Horsepower required: 130 H.P.

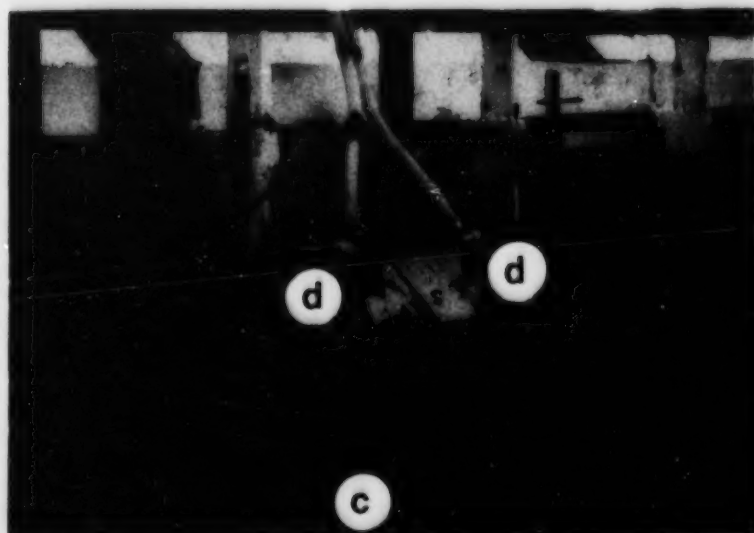


#### Modifications/Attachments

- a. Note tooth configuration — stubs only (no teeth) in rotary unit where furrow located
- b. Duck feet on S-tines for weed control between rows
- c. S-tines
- d. Sprayer boom and nozzles (used existing sprayer components — \$200)

#### Practical Tips for Use

- i) Tine needed 12" wide, 2" deep at 5 m.p.h.; plant seed just below tilled soil.
- ii) Use mulcher just ahead of planter so planting is done in moist soil.
- iii) Band spray on ridge when power mulching.
- iv) Loose soil from mulching prevents seed burial from opening on clay soils.

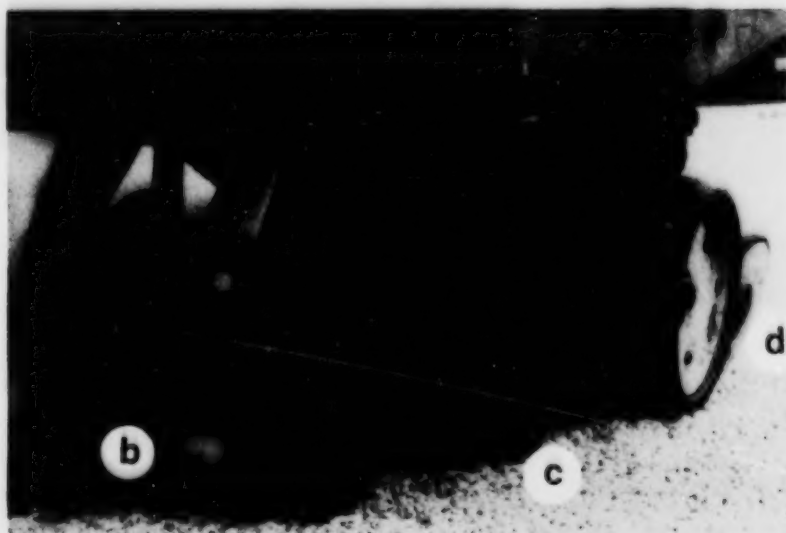


## RIDGE-TILL SYSTEMS — cont'd

### SYSTEM B — cont'd

#### 2. RIDGE-TILL PLANTER

Make: John Deere  
 Model: 7000  
 Size: 8 row — 30" row spacing  
 Year: 1982  
 Horsepower required: 120 H.P.  
 (15 H.P./row)



#### Modifications/Attachments

- a. Guide wheels ('Hiniker') (2 sets at \$1400/set)
- b. Stabilizing coulters (4 installed — \$150 each)
- c. No-till 1" bubble coulters ('John Deere' — \$45 each)
- d. Rubber press wheels

#### Planted Tips for Use

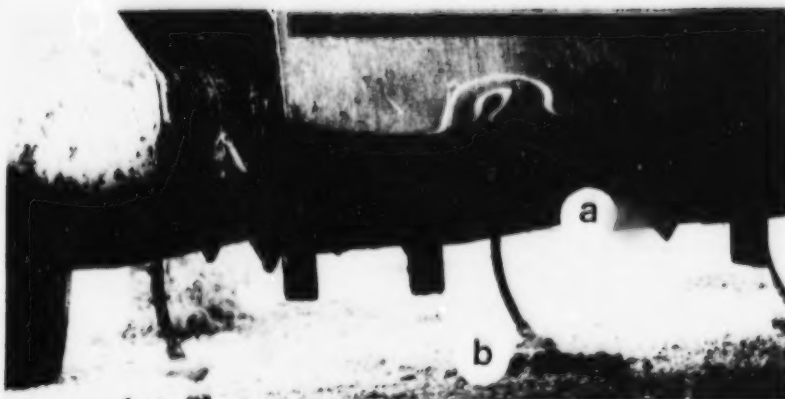
- |   |   |
|---|---|
| 1) Heads guide wheels and guide coulters to keep planter on ridge.  | 4) Till and plant headlands conventionally.   |
| 2) Prefer bubble coulters for tillage ahead of seed opener — more uniform seedbed when compared with fitted coulters. | 5) Equipment wheels adjusted to 120° centers.   |
| 3) Planter works best after ridges have been flattened.   | 6) Seed depth 15" on a 30" row. On soft soils, bury entire soil surface with broadcast seedbed. |

## RIDGE-TILL SYSTEMS — cont'd

### SYSTEM B

#### 1. POWER MULCHER

Make: Johnson  
Model: MC 830  
Size: 8 row — 30" row spacing  
Year: 1984  
Horsepower required: 130 H.P.

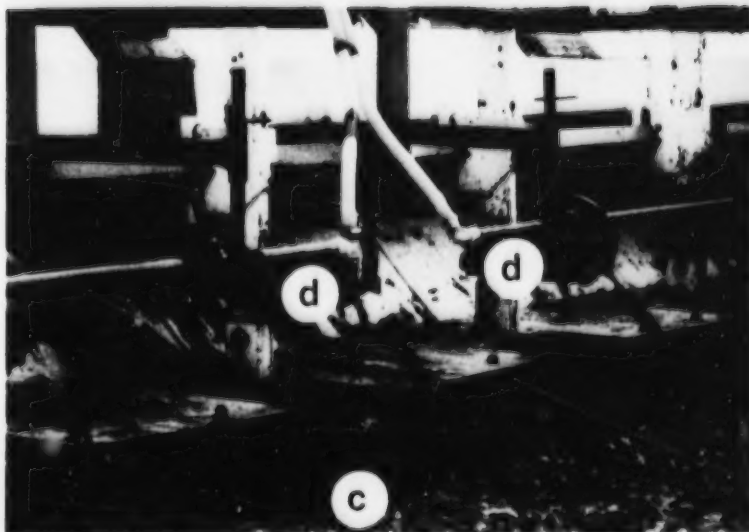


#### Modifications/Attachments

- a. Note tooth configuration — stubs only (no teeth) in rotary unit where furrow located
- b. Duck feet on S-tines for weed control between rows
- c. S-tines
- d. Sprayer boom and nozzles (used existing sprayer components — \$200)

#### Practical Tips for Use

- i) Tills seedbed 12" wide, 2" deep at 5 m.p.h.; plant seed just below tilled soil.
- ii) Use mulcher just ahead of planter so planting is done in moist soil.
- iii) Band spray on ridge when power mulching.
- iv) Loose soil from mulching prevents seed trench from opening on clay soils.

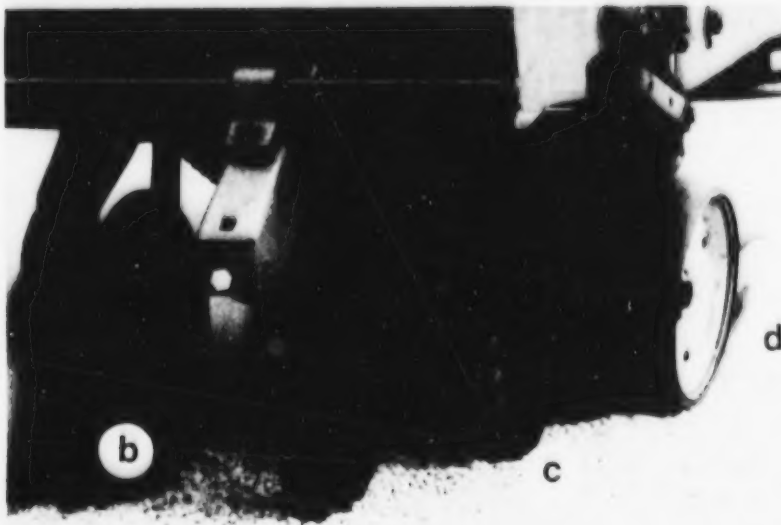
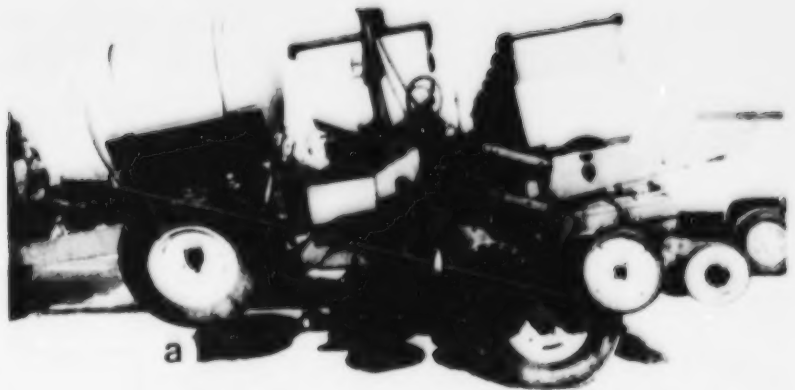


## RIDGE-TILL SYSTEMS — cont'd

### SYSTEM B — cont'd

#### 2. RIDGE-TILL PLANTER

Make: John Deere  
Model: 7000  
Size: 8 row — 30" row spacing  
Year: 1982  
Horsepower required: 120 H.P.  
(15 H.P./row)



#### Modifications/Attachments

- a. Guide wheels ('Hiniker') (2 sets at \$1400/set)
- b. Stabilizing coulters (4 installed — \$150 each)
- c. No-till 1" bubble coulters ('John Deere' — \$45 each)
- d. Rubber press wheels

#### Practical Tips for Use

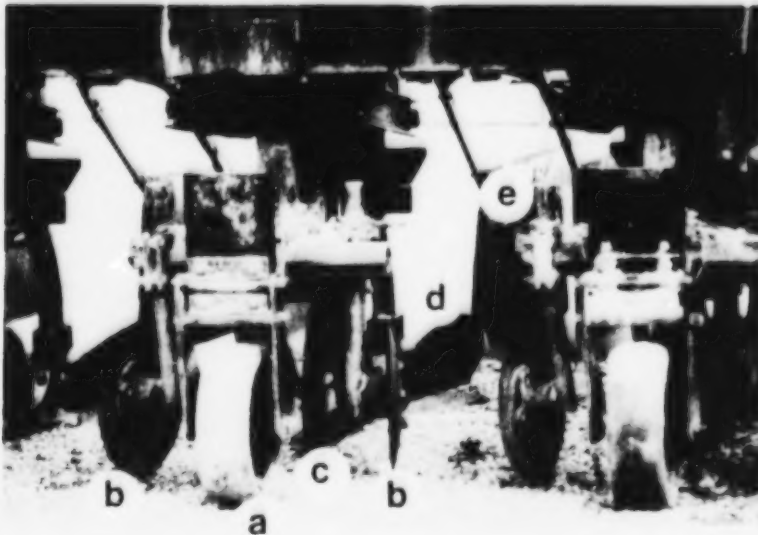
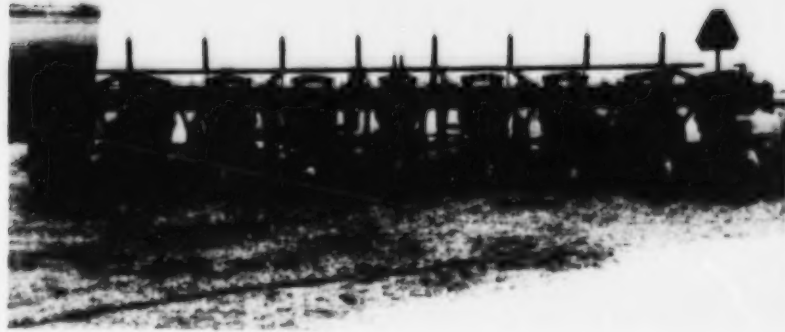
- i) Needs guide wheels and guide coulters to keep planter on ridge.
- ii) Prefer bubble coulters for tillage ahead of seed opener — more uniform seedbed when compared with fluted coulters.
- iii) Planter works best after ridges have been mulched.
- iv) Till and plant headlands conventionally.
- v) Equipment wheels adjusted to 120" centres.
- vi) Band spray 15" on a 30" row. On soybeans, spray entire soil surface with broadleaf herbicide.



## SYSTEM B — cont'd

### 3. RIDGE-TILL CULTIVATOR

Make: Hiniker  
 Model: 8307  
 Size: 8 row — 30" row spacing  
 Year: 1983  
 Horsepower required: 130 H.P.



#### Modifications/Attachments

- a. depth control wheels
- b. disc hillers (weeding discs)
- c. residue cutting disc (stabilizing couler)
- d. ridging sweeps (added penetrating points on sweep — \$30/row)
- e. row shields — \$35/row
- f. fertilizer side dress attachment (not shown) — \$500 total cost

#### Practical Tips for Use

- i) On hard ground, set disc hillers deeper to loosen enough earth for sweeps to move.
- ii) Cultivate at 7 m.p.h. if possible to crumble soil and ensure residue flow.
- iii) Row shields necessary to protect crop at high cultivation speeds.
- iv) Use cultivator to side dress 28% Nitrogen; one band on each side of row.

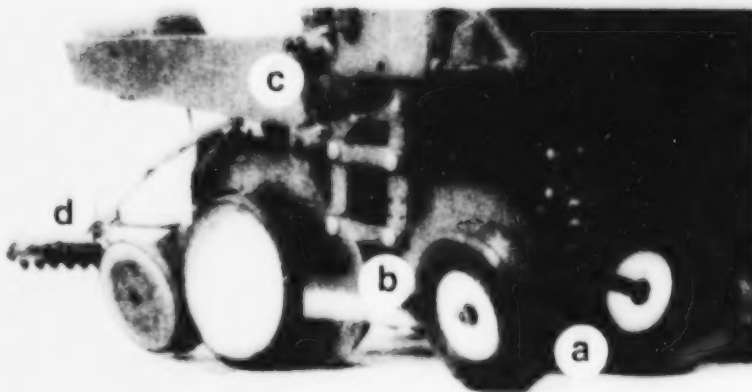
#### Field Conditions of Use (System B)

Corn Heat Units: 3150  
 Soil Texture: Brookston Clay  
 Drainage: good  
 Stoniness/Slope: some/flat  
 Crop Residue Types: corn, soybeans  
 Crops to be Planted: corn, soybeans

## SYSTEM C

### 1. RIDGE-TILL PLANTER

Model: 7100 (3 point hitch)  
 Size: 6 row — 30" row spacing  
 Year: 1984  
 Horsepower required: 90 H.P.  
 (15 H.P./row)

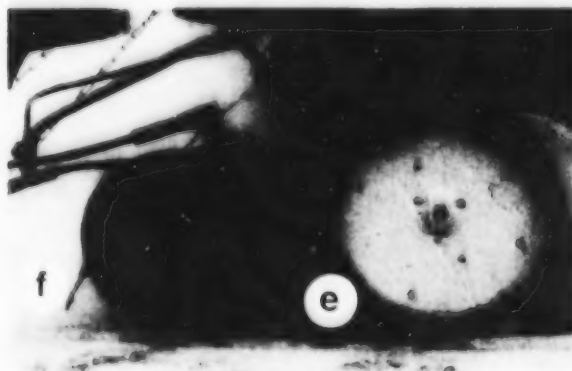


### Modifications/Attachments

- a. ridge hugging wheels ('Sukup')
- b. ridge-cleaning double discs and scraping blade. Note: Cost of ridge-cleaning unit (includes a and b) — \$500/row in 1984
- c. double down pressure spring set on planting unit — \$15/row
- d. band spraying unit; weighted finger tines
- e. side wall breaker for filling seed trench (\$35/row) — homemade
- f. 28% Nitrogen tube (N applied 4" to the side of seed)

### Practical Tips for Use

- i) Spray a 10 to 12" band of herbicide (post emerge) and incorporate lightly with finger tines.
- ii) Side wall breaker rolls dirt into seed trench to prevent opening in wet soils and/or dry weather.
- iii) Hydraulic arm on top point of 3 point hitch for quick adjustment on cultivator and higher lift on planter (for maintenance).
- iv) Chop corn stalks in the fall (separate pass with stalk chopper).
- v) Spot spray quackgrass with 'Round-up' before planting.
- vi) Modify tire spacing and size on grain buggy and combine to accommodate ridges.

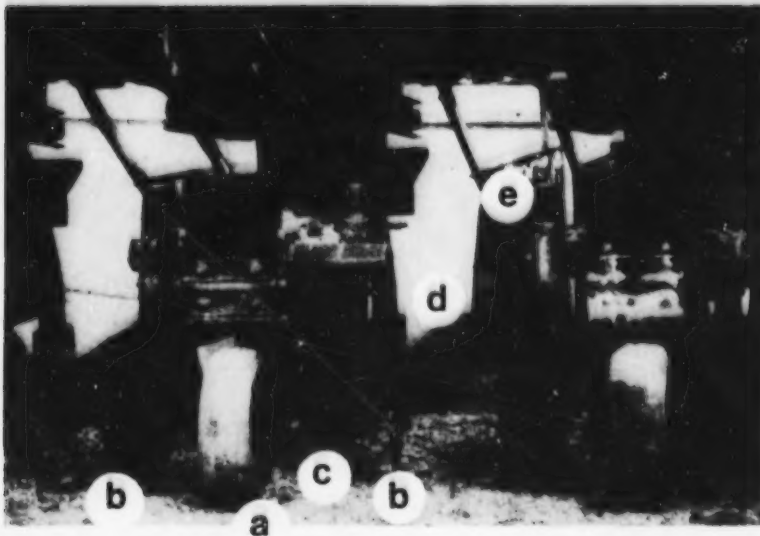
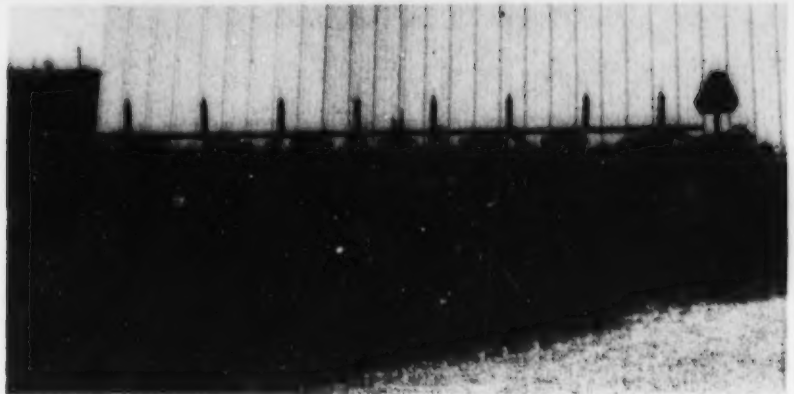


## RIDGE-TILL SYSTEMS — cont'd

### SYSTEM B — cont'd

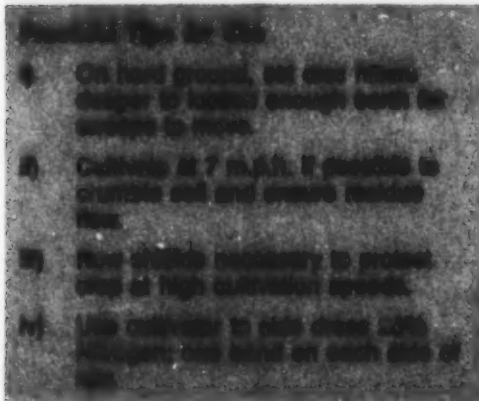
#### 3. RIDGE-TILL CULTIVATOR

Make: Hiniker  
Model: 8307  
Size: 8 row — 30" row spacing  
Year: 1983  
Horsepower required: 130 H.P.



#### Modifications/Attachments

- a. depth control wheels
- b. disc hillers (weeding discs)
- c. residue cutting disc (stabilizing coulters)
- d. ridging sweeps (added penetrating points on sweep — \$30/row)
- e. row shields — \$35/row
- f. fertilizer side dress attachment (not shown) — \$500 total cost



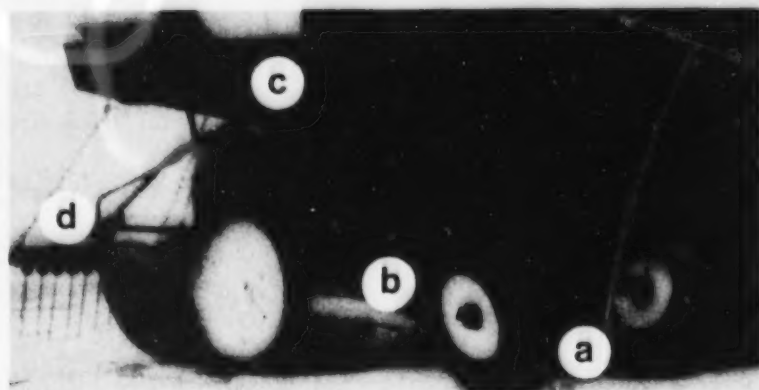
#### Field Conditions of Use (System B)

Corn Heat Units: 3150  
Soil Texture: Brookston Clay  
Drainage: good  
Stoniness/Slope: some/flat  
Crop Residue Types: corn, soybeans  
Crops to be Planted: corn, soybeans

## SYSTEM C

### 1. RIDGE-TILL PLANTER

Model: 7100 (3 point hitch)  
 Size: 6 row — 30" row spacing  
 Year: 1984  
 Horsepower required: 90 H.P.  
 (15 H.P./row)



### Modifications/Attachments

- a. ridge hugging wheels ('Sukup')
- b. ridge-cleaning double discs and scraping blade. Note: Cost of ridge-cleaning unit (includes a and b) — \$500/row in 1984)
- c. double down pressure spring set on planting unit — \$15/row
- d. band spraying unit; weighted finger tines
- e. side wall breaker for filling seed trench (\$35/row) — homemade
- f. 28% Nitrogen tube (N applied 4" to the side of seed)

### Proven Tips for Use

- i) Spray a 10 to 12" band of herbicide (post emerge) and incorporate lightly with finger tines.
- ii) Side wall breaker rolls dirt into seed trench to prevent opening in wet soils and/or dry weather.
- iii) Hydraulic arm on top point of 3 point hitch for quick adjustment on outwater and higher lift on planter (for maintenance).
- iv) Chop corn stalks in the fall (separate pass with stalk chopper).
- v) Spot spray quackgrass with "Roundup" before planting.
- vi) Rotate the seedling and seed on each row and combine 20 second.

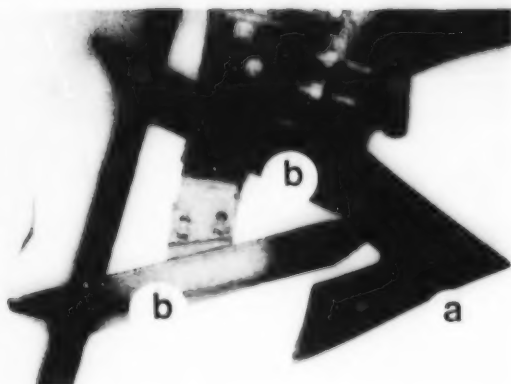




**SYSTEM C — cont'd**

**2. RIDGE-TILL CULTIVATOR**

Make: ProTech (Landoll)  
 Size: 6 row — 30" row spacing  
 Year: 1987  
 Horsepower required: 100 H.P.



**Modifications/Attachments**

- a. 16" sweep manufactured with downward tilting penetrating angle on point and blade ('MacKay', Saskatchewan — \$12/sweep)
- b. ridging wings
- c. (not shown) 28% Nitrogen applicators on both sides of row

**Other Equipment Modifications**

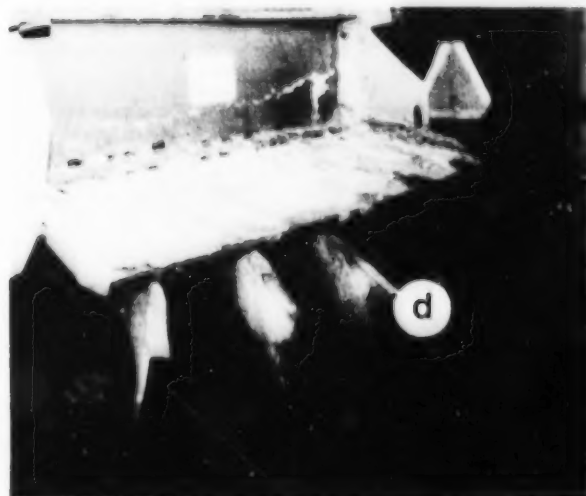
- d. extended fins on combine for better residue distribution

**Practical Tips for Use**

- i) Use a 16" sweep for loosening soil in furrow (see a).
- ii) Band spray herbicide when cultivating and sidedress with 28% N.

**Field Conditions of Use (System C)**

Corn Heat Units: 2850  
 Soil Texture: Perth Clay Loam  
 Drainage: fair to good  
 Stoniness/Slope: some/gently sloping  
 Crop Residue Types: corn, soybeans  
 Crops to be Planted: soybeans and corn

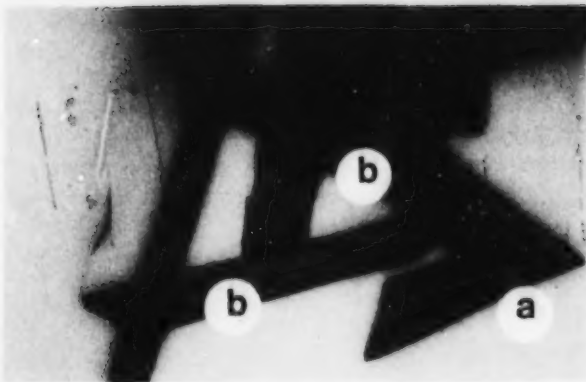




**SYSTEM C — cont'd**

**2. RIDGE-TILL CULTIVATOR**

Make: ProTech (Landoll)  
 Size: 6 row — 30" row spacing  
 Year: 1987  
 Horsepower required: 100 H.P.



**Modifications/Attachments**

- a. 16" sweep manufactured with downward tilting penetrating angle on point and blade ('MacKay', Saskatchewan — \$12/sweep)
- b. ridging wings
- c. (not shown) 28% Nitrogen applicators on both sides of row

**Other Equipment Modifications**

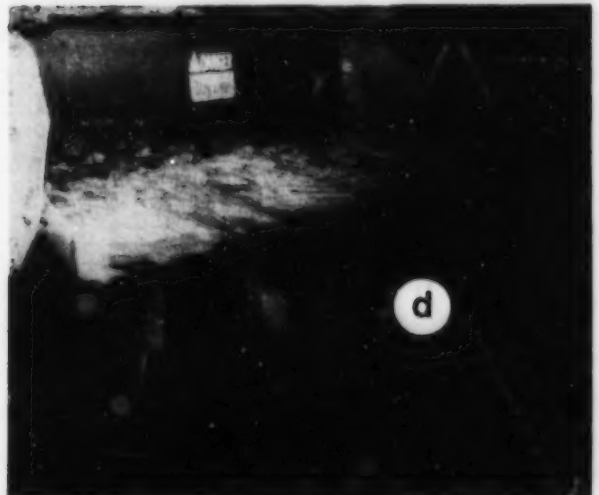
- d. extended fins on combine for better residue distribution

**Practical Tips for Use**

- i) Use a 16" sweep for loosening soil in furrow (see a).
- ii) Band spray herbicide when cultivating and sidedress with 28% N.

**Field Conditions of Use (System C)**

Corn Heat Units: 2800  
 Soil Texture: Perth Clay Loam  
 Drainage: fair to good  
 Stoniness/Slope: some/gently sloping  
 Crop Residue Types: corn, soybeans  
 Crops to be Planted: soybeans and corn



## **PARTICIPATING FARM OPERATORS**

The ideas of many conservation-minded individuals are, in one way or another, represented in this handbook.

However, conservation farmers who have participated directly in this project include:

**Ken Bee**

**Eric Devlaeminck**

**Paisley Johnson**

**Don Lobb**

**Jack McGregor**

**Clinton Pottruff**

**Jack Rigby**

**Charlie Shelton**

**Bruce Shillinglaw**

**Brian Skipper**

**Doug Smith**

**Laurence Taylor**